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RELATIVITY WITHOUT PARADOX

THERE are many to whom the Theory of Relativity still remains incomprehensible, not because of its patent technicalities, but rather in its basal principles. Thus the Theory is regarded as essentially paradoxical except to mathematicians; students have abandoned the effort to understand it, and remain content to accept it as undeniably true, in the light of the two criteria of pure demonstration and experimental verification by Astronomy and Physics.

It can not be too emphatically insisted that such an attitude is thoroughly unscientific, since it obviously assigns to the Theory that highly questionable status, supposedly enjoyed by theological dogmas, of a mysterious truth accepted perforce without being understood; a standpoint by no means foreign to Philosophy itself, as in the familiar instance of Kant's discussion of Freedom and allied subjects. But in fact there is nothing literally paradoxical or contradictory about the Theory in itself. On the contrary, it resembles every important scientific theory in being simply the logical outcome of natural phenomena; these being what they are, the Theory is their inevitable explanation. It is clearly revolutionary; but so was the Copernican Theory. It is abstract and obscure; but all advanced Mathematics is of this order. At first it seems to contradict ordinary experience; but so did the idea of antipodes. The initial requisite towards grasping the essence of Relativity, then, is to exclude the preconception that it is inherently

incomprehensible to the lay mind, and thus to perceive that all its difficulties are due, first to its mathematical technicality, and secondly to its fundamental expansion of our familiar views of Nature. This is so thorough that it inevitably acquires that false appearance of paradox and mystery which I have just repudiated. When, on the other hand, it is gradually approached from phenomena already familiar to everyone, Einstein's Theory falls (in my opinion) within the grasp of all intelligent minds, especially if another source of obscurity is avoided—that is the prevalent confusion between the purely scientific Theory and all philosophic problems of Relativity. Einstein's Theory is purely scientific; it certainly carries with it philosophic implications of the first importance; but these are conclusions to be inferred from the Theory, not presuppositions brought in advance to its interpretation. The majority of physicists are not concerned with any philosophic issues whatever; and it is undeniably misleading that the term "Relativity" should be used in both contexts.

We must begin, then, by excluding philosophic problems at the outset, such as the question of the essential nature of Space and Time, Motion and Matter, Subject and Object. We may return to these, but only at the end of our enquiry; and we must next recognise that certain modes of Relativity in general have long been perfectly commonplace, although these also appeared at first to be hopelessly paradoxical. The historic reform of the calendar, and the widespread opposition thereby aroused, plainly show that Relativity affects our whole reckoning of time, exactly as the adoption of Summer-time does on a smaller scale; while it is now, of course, easily possible for an American paper to foretell the future by reporting, in the afternoon, an event which happened in England on the same evening—an apparently paradoxical inversion of time order. Sim-

ilarly with sunrise and sunset; both are essentially local—
i.e. relative—affairs, and paradoxical to only stupid minds;
and the next point to notice is that the resultant discrepancies
can always be compensated by simple calculations that
are commonplaces of civilised intercourse. But simple as
these are, they fulfil exactly the same purpose as the abstruse
Lorentz equations and transformations of Relativity
Theory. There is no difference whatever of principle between
them, but only in the delicacy and intricacy of the
phenomena with which the latter deal, as contrasted with
the patent events of everyday. This should become clearer
if we imagine a group of men colonizing the Moon. If
they were ignorant they would be mystified by the general
reduction in weight, while the knowledge of gravitation
and arithmetic would enable them to apprehend the conditions
and to correlate their observations with people on
the Earth. This instance is again simple; still the close
connection between weight and mass should prepare us to
discern the analogy to the increase of mass, as velocity
increases, which is all-important in modern Physics; while
that velocity is itself always relative is obvious to every
traveller.

Thus the essential point is to realise that the basal *principles*
of Relativity are readily discernible in quite familiar
events; so that to specify these principles should remove
the mystery usually ascribed to Einstein's Theory. This
is true with respect to even one of the most perplexing
of all its features—the curvature of Space-time and the
consequent finitude of the material Universe. Let us approach
this by imagining two of our savage ancestors, ages
ago, quarrelling and then deciding to part never to meet
again. One travels due East, the other due West, each believing
that the farther he travels the greater is the distance
between himself and his enemy. But years later, after

crossing mountains and oceans, each sees approaching him a stranger who proves to be his old companion. But why, after following absolutely opposite directions, they should thus meet, must to their simple minds remain an insoluble paradox—a fact to be accepted but never understood, because they can not comprehend that their "flat" space is insensibly curved, while the curvature involves that the apparently infinite desert space is actually finite. Such gross ignorance naturally amuses us, till we reflect that our own minds occupy exactly the same standpoint with respect to Space-time curvature, as the savage mind does to Earth curvature. For each is confronted by something totally unfamiliar to ordinary experience, and therefore inevitably paradoxical. The average mind projects the surrounding space, which it imagines it fully understands, throughout the entire Universe, thus completely ignoring those complex relations between "pure space," ether and matter which necessitate Relativity curvature. To object that this statement does not enable us to "understand" such curvature is true, but irrelevant. For it means only that the intricacies of mathematical Physics must here be omitted; but quite similarly no one can "understand" even Earth curvature apart from a close acquaintance with astronomical theories. All such technicalities clearly pertain to experts, and the average mind can never hope to do more than comprehend the main governing principles.

My final illustration will be the simplest of all, but nevertheless the most significant. For it concerns the meaning of Simultaneity and the methods by which this is ordinarily determined.

It is an everyday experience that for observers close to the occurrence, seeing a blow struck is simultaneous with hearing it, while observers at a distance hear it after an interval which increases with their own remoteness. A

precise person would quite logically insist that even the initial simultaneity was only "practical" and not absolute, owing to the time light takes to travel. Ordinarily, however, "practical" simultaneity is sufficient, while elementary Acoustics enables us to reduce all the discrepancies to accurate accordance for both stationary and moving observers.

Now despite the familiarity of these conditions, they exemplify points of fundamental importance. In the first place, the discrepancies are all due to conditions which affect, not the *minds* of the observers, but only their bodies —*i.e.* their positions and velocities. Of course their minds also must be concerned, because they are conscious beings. This has given rise to the widespread delusion that Einstein's Theory is the result of the relation between the human *mind* and Nature, and therefore supports philosophic Subjectivism. But in my illustration the presence or absence of simultaneity obviously depends on the varying positions of the observers' *bodies,* since their minds are active continuously. This holds throughout all Relativity Theory; it is concerned with the relations between the observers' sense-organs and the physical environment,[1] not specifically with their minds; whence it follows that the philosophic issues of Subjectivism remain still open so far as Einstein's Theory is concerned.

The second point is that it is only necessary to substitute the vastness of sidereal space for the limits of everyday to realise that the velocity of light must there play exactly the same *rôle* as that of sound, the only difference arising from the high speed of light. Before considering the main consequences of this, three minor points demand attention: —(*a*). The velocity of light is great solely as contrasted

[1] More technically, and therefore more correctly, with the reference systems in which observers are situated.

with familiar wave disturbances. For if we could obtain a commanding view of the entire galaxy, we should then see the light rays travelling from star to star apparently as sluggishly as a snail crawling about a large garden, simply because the interstellar distances altogether dwarf even the eleven million miles which light traverses every minute. (*b*). The corrections necessitated by this velocity have become quite commonplace in connection with actual sunrise and sunset. (*c*). Reverting to the illustration of stationary and moving observers hearing a sound, it must be noticed that while, by correlating their individual experiences, they could all calculate the actual simultaneity, they would be dealing throughout with the same event (or succession of events), not with subjective and separate impressions. Here again misunderstanding has arisen, owing to seeing and hearing being confused with the observed event. It is plainly only the experiences of individuals that are discrepant; they may hear the sound at very different times, but the actual event (or succession) remains objectively single, and is the common focus of all their correlations; this again remains true when light is substituted for sound. Differently situated observers make mutually discrepant observations peculiar to themselves; but the Theory of Relativity correlates these with reference to events that are not peculiar but common to all; and whether these occur in a remote star or in the core of an atom makes no difference to this general principle.[2]

One of the most perplexing features of Relativity is the fact that if an accurate clock travels very rapidly away from us, it is observed to lose time at a rate proportional to its velocity, until if it could attain a velocity equal to that of light it would seem to mark the same hour without any

[2] "The frame of space used by an observer depends only on his motion." Eddington, *The Nature of the Physical World*, p. 14.

change, although its mechanism would continue to function as usual.   Conversely, an observer travelling along with the clock[3] would find it keeping normal time, while all Earth clocks would appear to him to be losing or—at light velocity —stationary.   Paradoxical though this seems at first sight, it is clear that there is already some analogy to the differently conditioned observers of any ordinary impact or explosion.   If then we accustom our minds to the swiftly travelling light waves instead of slow sound signals, our perplexity should begin to diminish; and if we now proceed to imagine terrestrial conditions altered a little further, we should readily understand why Relativity phenomena are all perfectly natural.

Let us then picture two observers, A and B, who have been blind from birth, but have become skilled scientific investigators.   Since light is quite unknown to them, all their knowledge of simultaneity and succession—*i.e.* of time and waves—must be derived mainly from the sounds they hear. They compute time therefore not by looking at clocks, but by listening to sound signals, and removing discrepancies by an intricate system of theoretical correlation.   If they use automatic guns firing every second, suppose they begin by standing together on a station platform, so that the two guns fire synchronously.   Thus far, the conditions are quite simple and analogous to our own experience of visible clocks.   Now suppose that A boards a swiftly moving train, leaving B on the platform.   Then although B will continue to hear his own gun's seconds exactly as before, it is clear that these will no longer synchronise with the signals reaching him from A, who is steadily moving farther and farther away, because each report from A's gun requires additional time to cover the intervening distance to B's ears.   Still further, as the train's velocity increases, each report from

[3] Technically, situated in the clock's own reference system.

A will have farther to travel than its predecessor had, and will therefore appear to B to be delayed as compared with his own reports, which continue of course to fire normal seconds. In other words, B will hear A's gun-clock go slow as contrasted with his own, while the contrast will become accentuated as the train's motion is accelerated. On the other hand, A's experience must naturally be the direct converse of this; for as the train carries him away, he hears his own clock firing normal seconds while B's gun seems to him to be slowing down more and more. All these occurrences are both simple and natural, even when we complicate the situation by additional blind observers travelling about at varying speeds. If they were ignorant, they would be hopelessly puzzled—exactly as the lay mind has been perplexed by Relativity! On the other hand, Acoustics would enable the blind persons to understand all that happened and so obtain the requisite correlations. Thus if we substitute light for sound, and remember that both alike require time to travel from their source to the sense-organs, the only essential difference being in their respective velocity, we can understand why an ordinary clock travelling away from an observer must appear to him to slow down exactly as A's gun seemed to B to do.

But this means that there are various types of "clock"; and in fact any mechanism whatever that records periodic changes will serve as a "clock"; whence it immediately follows that since many atomic and electronic processes are periodic, they also are infinitesimal "clocks," whose rates of vibration must be affected by any high velocity precisely as was the ordinary clock in the foregoing illustration. To pursue this aspect further involves the technicalities of current Physics and Mathematics; but quite apart from these, it should now be no paradox that the mass of a swiftly travelling particle increases proportionately to its velocity,

and becomes infinite if its velocity equals that of light itself; while mass is so fundamental an attribute that these variations inevitably involve many allied physical phenomena.

It is then no exaggeration to say that Relativity depends on the fact that light, like sound, has a finite velocity. "We have not taken account," observes Einstein, "of the inaccuracy involved by the finiteness of the velocity of light."[4] In this connection another popular fallacy should be corrected. For it is not the case that the velocity of light is the greatest possible velocity that can ever be actually *attained;* it is only the greatest that can ever be actually *observed* and recorded. Prof. Eddington has given a clear illustration of this;[5] and though it may, once again, seem paradoxical that this velocity should remain invariable under all possible conditions, this paradox also vanishes as soon as we realise that all our knowledge of natural phenomena is revealed, ultimately, by light signals of various types. Light waves travel from an ordinary clock to our eyes; and quite similarly from the stars and from spectra. Apart from light man would plainly be in the dilemma of the congenitally blind observers previously referred to. Now this means, in the end, that in order to ascertain the velocity of light waves we are absolutely dependent on those very waves themselves. For these are our ultimate signals, which we can not correct by any others whatever. Thus light may be imagined as a celestial page-boy, whose own answer we must accept whenever we ask him how rapidly he travels; actually he invariably gives the same reply, which can be checked in no way at all, since all experiments yield the same result.

At this point it is often asked—"But is this *really* true? Are these perplexing variations in mass and in time inter-

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4 *The Theory of Relativity,* p. 10.
5 *Op. cit.,* p. 56.

vals real, or only apparent? Do they actually occur, or only seem to occur?" The answer turns on the meaning of the terms "really" and "actually." We know the actual, obviously, only through some mode of experience— sense-experience, thought, emotion or otherwise. Now "Reality," in the end, is what human experience, when taken in its entirety and under all conditions, consistently reveals. A dream or a mirage is "unreal" because it is, no matter how, inconsistent with the entirety of human experience; so that failure to detect such inconsistency involves error, illusion or even insanity. To the insane themselves their "world" is intensely real; but it is fatally inconsistent with racial experience and therefore with Reality. Conversely then, the invariable velocity of light must be accepted as "real," and not merely apparent, because it invariably—i.e. consistently—results from all scientific experience, both experimentally in direct observation and theoretically in calculation.

This raises a further fundamental feature. In one highly important sense, the relative is what appears to occur, or "seems" to exist; whence it follows that as Reality is discovered, to that degree Relativity diminishes. In this respect the title "Theory of Relativity" is somewhat misleading, since it may easily be understood to exclude absoluteness completely. The truth is however the direct contrary; for one of the principal aims of the Theory is to ascertain as many absolute characteristics of Nature as possible. "It is a common mistake to suppose that Einstein's Theory asserts that everything is relative. There are absolute things in the world";[6] so that since there are undeniable absolutes for Science, there may be absolutes for Philosophy also.

Similarly with respect to Gravitation. Almost univer-

[6] Eddington, op. cit., p. 23.

sally the Theory has been taken to disprove the existence of gravitational forces or influences; or still more crudely, to have proved Newton's theory to be erroneous. But this is very far from being the case; Newton's Theory itself is a very close approximation to Einstein's, and under certain conditions identical therewith; and the correction due to Einstein's may be compared to the discovery of a slight error in the annual accounts of a wealthy corporation. The issue here depends on the two types of velocity with which Physics is concerned—as uniform, or accelerated; for whenever acceleration occurs, the phenomena then become indistinguishable from those observable in some gravitational field. This is explicitly recognised by Einstein himself in his use of the term "Principle of *Equivalence*," which plainly implies that the phenomena due to acceleration are *equivalent* to those due to gravitation; so that while the concept of Gravitation has been profoundly modified, it by no means follows that the existence of Gravitation must be denied. It depends wholly on the standpoint adopted. For the pure mathematician is not directly interested in Gravitation as actually existing in Nature, any more than an accountant is directly concerned with the motives of his clients. Both alike require no more than the mathematical data of their respective calculations.[7] The pure mathematician may thus be called the accountant of Nature; but when we pass beyond pure Mathematics to Physics, the existence of Gravitation, ether and allied natural entities at once becomes a relevant problem. "This does not mean," observes Eddington, "that the ether is abolished."[8]

Similarly as regards the character of Space and Time as such. Relativity is not at all concerned directly with

[7] "To the mathematician the physical properties of substances which give material representation of an equation are quite irrelevant." Maccurdy, *Common Principles in Psychology and Physiology*," p. xiii.

[8] *Op. cit.*, p. 31.

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these, but only with the methods and systems of *measuring*
them; that is with "space-time intervals." Again to quote
Eddington, when the physicist "speaks of space it is always
the inches that he should have in mind."[9] In recent discus-
sion it has been contended that because the observed inter-
vals must vary with varying reference-systems, therefore
Space and Time must in some way be mind-dependent. But
here there is obviously a dual confusion—first of space-
time intervals with Time and Space themselves, and second-
ly of reference systems (which are purely physical) with
mind as psychical. The latter is plainly fatal, while the
former is comparable to confusing the differing national
weights and measures with the liquids and metals to which
these are applied. A parallel erroneous belief is that the
idea of the four-dimensional Space-Time-Continuum im-
plies some incomprehensible transformation of Time into
some mysterious kind of Space. The truth is that mathe-
maticians can conceive four-dimensional space, although no
human being can ever picture or imagine this. In such
space, again, it is possible to construct a timeless schema
of temporal processes—of non-temporal world-lines and
coordinate systems. But all this is merely an expansion of
the long familiar facts that graphs, which are plainly purely
spatial, and mathematical and chemical equations, which
are obviously timeless, often represent temporal processes.
In spite of this, however, Time remains Time and Space,
Space, exactly as hitherto; all that is requisite is to avoid
the confusion between the four-dimensional Space-Time-
Continuum, and four-dimensional Space, which is really
like confusing "honest Abe" with the Hebrew patriarch!
Likewise as regards Past and Future. These also, for
each individual, must be kept mutually distinct, in spite of
the fact that events simultaneous for one observer may be

[9] *Op. cit.*, p. 14.

successive to another who is in a different reference system.[10]

Finally, it is often asserted that the new concepts of Matter and Energy or electricity, as being in some manner identical, involve the repudiation of philosophic Materialism. But this again is quite illogical. Even though Matter is a mode of Energy, or atoms composed of electrical particles, still Matter remains physical, and not in any degree psychical or mental; unless of course we begin by presupposing Panpsychism. Apart from this, Matter becomes no more immaterial than before; no more akin, in other words, to consciousness or mind as such. Energy and electricity are no more "spiritual" than cohesion and gravitation; so that the sphere of Nature remains precisely as material, and also as mechanical, as it was before Einstein's Theory was advanced.

10 *Cf.* Eddington, *op. cit.*, 37, 48, 58.

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RECENT INTERPRETATIONS OF RELIGION IN GERMAN-SPEAKING COUNTRIES[1]

I

IN the broad field cultivated by the sciences and the philosophy of religion, the developments in German-speaking countries during the past two decades have been manifold and fruitful. A number of different influences have conspired to revive anew the interest in its problems. On the one hand, religious thought and life were strongly stimulated and stirred by the events of the war and the revolution, and this inevitably led to important changes in the scientific treatment of religious questions and views. Theology manifested a new form of spiritual struggle, and this was sustained by powerful forces of genuine religious experience. On the other hand, the various sciences, and philosophy as well, were impelled by the very pressure of their own problems to reckon afresh with religion and with its claim to truth.

Now the interpretation which confessional religion gives of itself and the interpretations of the special sciences of religion (starting, respectively, from dogmatically given contents and from empirically given facts) intersect at the crucial question of the nature and truth of re-

ligion.   Insofar as this is the case they should be in-
cluded within the philosophy of religion.   For all investi-
gations devoted to the central problems of nature and
truth presuppose, either explicitly or implicitly, a philo-
sophical decision respecting the competency of specific
methods of attack.   Moreover, the philosophy of religion
proper must maintain the closest possible connection with
all the other sciences of religion.   Hence it is advisable,
in any survey of the present sort, to draw the circle wide
enough to include a consideration of at least those sci-
ences which take the first steps toward a critical inter-
pretation of the traditional ecclesiastical doctrines or of
the facts which historical investigation has brought to
light concerning the general development of religion.   To
be sure, we are here compelled to limit ourselves to the
literature that is most important, that is, to those publi-
cations which in some manner touch the characteristic
problems of the philosophy of religion.   Now the empiri-
cal sciences of religion, especially, are able to restrict
their attention to matters of historical fact—to questions
concerning the origin and development of religion, and
its manifestations in the life of the individual and in the
total complex of external culture—and thus to leave aside
the question as to the truth to which religion lays claim.
Nevertheless, historical, sociological and psychological in-
vestigations are disinclined to withhold judgment concern-
ing the nature and the value of religion, and such a judg-
ment may not be reached without an examination of the
religious truth which theology asserts and defends.   Con-
versely, theology and the philosophy of religion proper
are compelled to familiarize themselves with the results
and the reasoning of the empirical sciences and to accord
to the latter their proper significance.

The fact of such an interrelationship of problems is

clearly attested by the literature of the subject. Every attempt to disregard it strikes upon insuperable difficulties, whereas the task itself, that is, the interpretation of religion, is directly furthered according as considerations of method receive more conscious and more effective attention.

II

Despite the fact that Max Weber's work remained in part unfinished, the extraordinary achievements of this scholar in the field of sociology make us realize the heavy loss which science suffered through his all too early death. His *Gesammelte Aufsätze sur Religionssoziologie* form a landmark in the history of this science. They contain first of all the famous essay in which are disclosed the connections between the ethics of Protestantism, especially Calvinism, and the rise of the capitalistic spirit in the economic order of the Occident. Supplementing it is a paper relating to the individual sects of Protestantism. The remaining essays are concerned with the manner in which the world religions deal with the ethics of the economic order. Here the author presents his conclusions regarding China, India and the ancient Hebrews, though in this last case his studies remained incomplete. The execution of further plans was denied him. Of high value for the science of religion is his interpolated study, *"Theorie der Stufen und Richtungen religiöser Weltablehnung."*

Weber's work on the Christian ethics of the economic order was supplemented along certain lines by the theologian Ernst Troeltsch, particularly in his *Die Soziallehren der christlichen Kirchen und Gruppen.* Troeltsch here deals with the Christian conception of the community, both by reference to the history of dogma and likewise

systematically.   The "sociological structure of Christianity," in his view, is characterized by the fact that in it individualistic and universalistic motifs exist both side by side and intertwined.   "The individual may regard himself as of infinite worth."   In this wise the individual is rendered absolute.   This on the one hand removes all terrestrial and social differences, and on the other adds strong emphasis to the thought of the community, inasmuch as altruistic commands are included among those which the individual must obey if he would attain to personal sanctification.   Furthermore, those who seek sanctification for the service of God come together precisely in their common goal, that is in God.   "Inasmuch as the conception of God is not that of a passive bliss but that of a creative will, those who are united in God must actively manifest His loving will."   "From an absolute individualism there thus springs an equally absolute universalism, both alike possessed of a purely religious basis and securely anchored in the thought of a holy and firm loving will."   Succeeding the systematic exposition of these central ideas is a larger section of an historical character. The "social self-development of the religious idea" is here distinguished from its relations to the social creations of the secular order.   Troeltsch finds three main types of religious groupings: the *church,* which seeks to incorporate the masses and to adapt itself to the world; *sects,* which unite only strict believers and sunder themselves into small societies; and the *mystic group,* whose formation is along strictly personal lines, if indeed it takes place at all and does not give way to a "relativistic individualism."

Troeltsch's findings did not remain uncontested from the side of sociology and theology.   From the standpoint of Roman Catholic presuppositions, for example, they

were subjected to a detailed critique by Otto Schilling in his *Die christlichen Soziallehren.* Schilling utilizes an intensive study of the patristic and scholastic sources in an attempt to invalidate Troeltsch's contentions regarding the sociological tenets of Christianity, their development and influence upon the family, society, and the State. He concludes his book with an eulogy of the social teachings of Thomism, which he regards as the final presentation of Christian principles respecting the fundamental structure of human relations.

Alongside of Weber and Troeltsch, in their sociological investigations, we find a philosopher in the person of Max Scheler. The most important contributions to a sociology of religion which we owe to him personally or to his school are to be found in the second volume of *Schriften des Forschungsinstitutes für Sozialwissenschaften in Köln.* The introductory essay is from Scheler's own pen; later, in 1925, this appeared in an elaborated form as a separate treatise entitled *Wissensform und Gesellschaft.* Of the other contributions mention should especially be made of *"Indische Lebenskeise"* by Spindler, *"Soziologie der Mystik"* by Honigsheim, and *"Soziologie des Steiner-Kreises"* by Stein.[2] Scheler's sociological studies rest upon a deep-going and comprehensive investigation of all spheres of human consciousness; in this he employs the phenomenological method initiated by Husserl and concerned not with psychological laws of genesis and development but with the *a priori* laws of essence. In referring to such methodological considerations, however, we are passing from the circle of sociological concerns into that of the psychology of religion.

[2] An interesting specific problem is discussed by Joachim Wach in his *Meister und Jünger. Zwei religionssociologische Betrachtungen,* Leipzig, 1925.

III

The quarrel respecting the methods of psychology and their adequacy to solve questions concerning the nature and truth of religion, had already continued a considerable time before Wilhelm Wundt, shortly prior to the period dealt with in the present survey, brought to completion his great works.   In 1911 he published his *Probleme der Völkerpsychologie;* in 1914 and the years following thereupon, the second edition of the volumes on *Mythus and Religion* which form a part of his monumental *Völkerpsychologie*.   In view of the fact that the subsequent psychology of religion has devoted much attention to the doctrines of Wundt, it may be well for us at this point briefly to remind ourselves of their essential features.   Religion, Wundt tells us, "did not spring from a single root, but from several.   Whoever would seek its origin psychologically must endeavor to penetrate into the total complex of the phenomena of religious life and to understand the relations of their separate constituents to one another as well as to other departments of human experience."   Now, religion, like the other great mental creations, is not exclusively or primarily the product of the individual mind but is a manifestation of the folk mind.   Hence the proper method of its study is to start with an analysis and interpretation of anthropological facts; the goal, however, is the genetic explanation of the nature of religion.

. Wundt's psychology of religion includes among its concerns a decision with respect to the question of truth.   In contrast thereto Karl Girgensohn's comprehensive work, *Der seelische Aufbau des religiösen Erlebens* (Leipzig, 1921), represents, methodologically, a continuation of the positivistic movement, and holds itself within closer and more modest limits.   Girgensohn studied the persons of

his own day. To secure experimentally founded scientific knowledge of them—he considered scientific knowledge impossible without resort to experiments—he undertook to utilize the method developed by Külpe in his psychology of thought. It is impossible, however, to experiment with religion itself without thereby essentially changing it. Hence the object of investigation must be religious experiences artificially aroused through the hearing or reading of religious texts, the observers being required to report their ensuing experiences. Girgensohn's aim was to ascertain not the meaning and content of these experiences but the formal stuctural elements of the religious life, more particularly the significance of value judgments for religion, the psychological nature of religious certainty, and the nature of religious confidence. The conclusions which he reached after working through a stupendous amount of material are not especially important, particularly inasmuch as his discoveries concerning the "essential elements which no religion may lack" apparently derive in no small measure from the experimental procedure of the particular psychology which he employed.[3] The underlying motive of such approaches as utilize the materials of empirical observation is obviously the perfectly natural desire to study religion without preconceptions. All extraneous standards such as that of a fixed theological dogmatics, or a philosophical theory of knowledge and of reality, are to be thrust aside in favor of an unbiased interpretation of the psychological facts. It is with such arguments that Hermann Faber,[4] for example, champions the standpoint of

[3] Other experimental researches in the psychology of religion are: Werner Gruehn, *Das Werterlebnis,* Leipzig, 1924 (continuing the work of T. Haering); Wilhelm Stählin, *Experimentelle Untersuchungen über Sprachpsychologie und Religionspsychologie,* in the initial volume of *Archiv für Religionspsychologie*— a journal edited by Wilhelm Stählin as the organ of the *Gesellschaft für Religionspsychologie.*

[4] In his *Das Wesen der Religionspsychologie,* Tübingen, 1913.

empiricism, without however defending a merely analytical psychology of elements, that is, an anatomy of the mind. Through his emphasis upon the phenomenological discovery of meaning he separates himself rather widely from the extremely empiristic position of such a writer as Koepp,[5] who seeks to introduce even into theology the method of "pure observation." He believes that an "empirical-inductive" procedure alone affords us a direct contact with reality, and that the "statistical-historical" and the "logical-dialectical-systematic" methods must be regarded as but "supplementing extensions of the one original path of induction." Hence he makes the demand for an "inductive theology free from all traces of a rationalistic mode of procedure and faced entirely in the direction of reality."

In spite of their polemics against rationalistic modes of thought, the one-sided views just referred to always cloak a good bit of dogmatic intellectualism. Indeed, the path which leads from them to positivism and to other offshoots of the philosophy of the Enlightenment is not a very long one. Fritz Mauthner,[6] operating with a concept of reality narrowly fashioned by the "understanding," subjects the history of occidental religion to a devastating critique. Devoid of any very deep comprehension of religious problems, he accuses every thinker who entertains religious ideas (especially a faith in God) of intellectual dishonesty or casts upon him the suspicion of hypocrisy. That it is possible to approach these spiritual facts with a deeper understanding and a higher respect, even when regarding religious ideas as fictions or illusions, is shown by the writings of Hans Vaihinger and his followers, as well

[5] Cf. his Einführung in das Studium der Religionspsychologie, Tübingen, 1920; and Grundlegung zur induktiven Theologie, Greifswald, 1923.

[6] In his Der Atheismus und seine Geschichte im Abendland, Stuttgart/Berlin, 1920.

as by those of the creator of psychoanalysis, Sigmund Freud.

It was certain passages in Kant that gave Vaihinger the clue that led to his *Philosophie des Als-Ob*. This book, to be sure, antedates the works with which we are here primarily concerned. It still, however, continues to exercise a considerable influence, and this in spite of the fact that, as early as 1919, Heinrich Scholz subjected it to a severe criticism from the standpoint of religious philosophy. Freud, on the other hand (in his *Die Zukunft einer Illusion*) agrees with Vaihinger that the teachings of religion are based on practical "fictions" and that they lack theoretical proofs. He holds, however, that, once their fictitious character has been established, they will not continue to remain acceptable "to persons uninfluenced in their thinking by the arts of philosophy." This difference of opinion between Vaihinger and Freud is due to the fact that they establish in different ways their common doctrine as to the "fictitious" or "illusory" nature of religious beliefs. Vaihinger holds that the practical-religious fiction is inseparable from genuinely ethical conduct; indeed, for him "right conduct is identical with belief in God and in immortality." Freud, on the other hand, believes it possible to remove the religious illusion and to secure for it substitutes that may be rationally established. For, in his view, psychoanalytic interpretation shows that religion represents not "deposits of experience" or "conclusions of thought" but unconscious self-deceptions, "fulfillments of the oldest, strongest and most urgent wishes of mankind." Concerning their truth he wishes to withhold judgment. "As yet our knowledge is too limited to enable us to make a critical approach to them." So long as they are incapable of demonstration, he holds, they may also not be refuted. Such a state of ignorance does not afford the

right to believe; for "scientific effort is for us the only way that can lead to a knowledge of external reality." Nevertheless it is of no little moment to have recognized that the teachings of religion, as respects their psychological nature, are illusions. Though psychoanalysis is only a method of investigation, an impartial instrument incapable of passing on the truth of religion, it nevertheless augments our doubts. Hence Freud thinks it desirable, in the interests of cultural progress, that religion, which possesses all the earmarks of a neurosis, should be superseded by mature scientific knowledge. The psychoanalyst Johann Kinkel[7] reaches a similar conclusion. According to him "all social manifestations of religion are infantile phenomena that fall exclusively within the scope of social psychology, and that derive from the infantile era of the mental development of mankind." He is of the opinion that, even if the psychological motive represented by the religious feeling will never disappear, men will not always continue to react thereto in the original infantile manner and that religion will in consequence cease to be. Thus, as a matter of fact, psychoanalytic interpretations terminate in a negation of religion.

IV

The uncertainty prevailing in the psychology of religion as respects the matter of method, brought on a voluminous literature concerned primarily with basic epistemological and methodological questions. In his *Einleitung in die Religionsphilosophie* (Göttingen, 1918) Paul Gese discussed the various standpoints and methods for investigating the nature of religion. He himself favored the procedure of self-reflection under conditions in which

[7] See his *Zur Frage der psychologischen Grundlagen und des Ursprungs der Religion,* Leipzig/Wien/Zürich, 1924.

the individual immerses himself in significant religious lives, whether of individuals or of civilizations. This, he held, would yield an intuitive certainty of truth. Thus Gese sought to maintain his distance alike from the speculative and from the empirical method. Joachim Wach,[8] on the other hand, attempts to offer a new theoretical basis for the empirical investigation of religion, such as may avoid the pitfalls of psychologism. T. K. Oesterreich[9] likewise starts with epistemological reflections. By these he is led to restrict the task of religious psychology to an analysis of religious life in its typical manifestations, refraining from any judgment respecting the reality claims of religion. Oesterreich's account of the forms and the developmental stages of the religious conciousness offers a suitable and a fruitful basis for the philosophy of religion.

No less cautious than the procedure of Oesterreich is that of Richard Müller-Freienfels in his *Psychologie der Religion*.[10] In this case also the psychological investigations are not designed as more than "perhaps useful preliminary work" for a metaphysical examination and conclusion respecting "the existence of a superior and transcendent world" such as religion affirms. Wilhelm Bruhn,[11] on the other hand, energetically seeks to go one step further and, following Frischeisen-Köhler, to discover a point at which the psychical life itself refers beyond the merely subjective. "Egohood," he points out, perdures throughout the change of psychological conditions. Hence

[8] *Cf. his Religionswissenschaft: Prolegomena zu ihrer wissenschaftstheoretischen Grundlegung,* Leipzig, 1924.

[9] In his *Einführung in die Religionspsychologie als Grundlage für Religionsphilosophie und Religionsgeschichte,* Berlin, 1917, *Cf.* also *Die religiöse Erfahrung als philosophisches Problem,* Berlin, 1915.

[10] *Vol.* I: *Die Entstehung der Religion; Vol.* II: *Mythen und Kulte,* Berlin and Leipzig, 1920.

[11] *Cf.* his *Glauben und Wissen,* Leipzig, 1921, and *Der Vernunftcharakter der Religion,* Leipzig, 1924.

it is a factor independent of the subject and is the basis of
all objective reality, including the contents of the religious
life.

It was likewise by reference to abiding functions and
structures in the nexus of experience that the particular
type of psychology which was decisively influenced by
Wilhelm Dilthey[12] sought to overcome psychologism and
to do justice to the claims of religion. Thus, for example,
Eduard Spranger stressed the fact that no psychological
phenomenon is intelligible without reference to objectifica-
tions of meaning—that we cannot explain and interpret
the psychological except through objective spirit.   Hence
the initial task of psychology is that of comprehending the
chief realms of the spirit, especially their structure.   The
discovery of the nature or essence of such realms in the
temporally conditioned and historical forms in which alone
they are given to us, is, of course, in turn dependent upon
the conditions of "understanding"; for all sides of scien-
tific knowledge are in correlation, just as the mental life
itself is an indissoluble unity.   "The individual soul must
be conceived as a meaningful complex of functions in
which various value-interests are related to one another
through the unity of self-consciousness."   One of these con-
ceptually independent value-interests is religion.   Accord-
ing to Spranger, this consists in the reference of specific
experiences to the total meaning of the life of the indi-
vidual.   "The kernel of religiosity must be found in the
quest for the highest value of existence."   Admirable as
may be Spranger's description of the form of life and
the characteristic mood exhibited by the religious indi-
vidual, his excessively subjective characterization never-
theless leaves out of account certain essential features of

[12] Dilthey's collected works (Leipzig, 1925 and following) contain two
essays on religion: "Die geistige Welt," in Vol. IV, and "Der Aufbau der
geschichtlichen Welt in den Geisteswissenschaften," in Vol. VII.

religion. Even Schleiermacher, of whom there is much in Spranger to remind us, was prevented, by his excessive preoccupation with feeling, from entirely escaping the danger of overlooking that which is peculiar to the religious sphere of meaning.

Schleiermacher's conception of the "feeling of absolute dependence" is unsatisfactory on several counts. Psychologically, its chief defect is that it makes feeling primary and relegates the object, that by which alone the feeling acquires a characteristically religious cast, to the secondary status of a cause reached through inference. In actual religious experience, however, the overpowering impress of the divine is throughout the salient feature. On the basis of this insight Rudolf Otto characterizes the religious feeling more aptly when he refers to it as "creature feeling." His book, *Das Heilige* (Gotha, 16th ed. 1927) carefully analyses this feeling and sharply distinguishes it from all other emotional experiences. In point of method Otto attaches himself to Fries, and in part also to the religious philosophy of William James. As against the genetic and explanatory psychology of Wundt, he defends the thesis that the fundamental concepts of religion are *a priori*. He thinks of the religious *a priori*, of course, in terms not of the transcendental-critical thought of Kant but of the psychological-anthropological standpoint of Fries. Otto seeks to prove that religious phenomena are unique, independent, and underived. His criterion is an intuitive certainty emotional in character and attained through sympathetic understanding and through empathy. In treating the concept of the holy he sets forth in a particularly vivid way its non-rational aspects. The divine for him is *"mysterium tremendum," "fascinans," "augustum,"* the "completely other," before whom the creature quakes and shudders

while yet feeling itself irresistibly attracted. The divine is in all of its aspects more than merely the superlative of the earthly and the human. Hence it is exalted above any words and concepts by which we may seek to express or to define it. Only with extreme inappropriateness may we utilize for its description such analogies of a rational sort as fear, reverence, love, benevolence, omnipotence, etc. These are all but "schematizations" of the non-rational "x" of Otto's doctrine. Otto never tires of adducing new proofs from religious literature and art to confirm this difference in quality and this uniqueness of the "numinous," as he is fond of designating the holy. He seeks to bring the reader himself to an experience of it, quite in line with his hypothesis that man is endowed with religious "divination," that is, an original disposition which alone is competent to pass on the validity of assertions respecting religion. Divination is "the faculty of genuinely cognizing and recognizing the holy in its appearances." Its import is "the glimpse of an Eternal, in and beyond the temporal and penetrating it, the apprehension of a ground and a meaning of things in and beyond the empirical and transcending it."

To be sure, Otto does not satisfactorily clarify the relation of the rational and the non-rational features upon which he insists. Indeed, the two concepts themselves remain shrouded in a certain obscurity. Otto decisively rejects the view that the numinous developed from other elements of experience, whether as a result of intensification or by a process of transformation. "Religion is not in vassalage either to morality or to teleology, 'ethos' or 'telos,' and does not draw its life from postulates. Its non-rational content, no less than its rational, has its own independent roots in the hidden depths of the spirit itself." Nevertheless Otto holds that progress in religion consists

of an harmonization of its two component features, in a synthesis of the non-rational and the rational. "By the continual living activity of its non-rational elements a religion is guarded from passing into 'rationalism.' By being steeped in and saturated with rational elements it is guarded from sinking into fanaticism or mere mysticality, or at least from persisting in these, and is qualified to become a religion for all civilized humanity. The degree in which both rational and non-rational elements are jointly present, united in healthy and lovely harmony, affords a criterion wtih which to measure the relative rank of religion—and one, too, that is specifically religious." In criticism, Ernst Troeltsch has with justice declared[13] that these contentions of Otto are not the outcome of a purely psychological analysis but the products of a rationalistically and formally constructed interpretation of history. As a matter of fact, Otto gradually continued more and more to abandon these presuppositions in favor of a purely phenomenological approach.

Along with Otto, George Wobbermin[14] deserves special mention as one who has significantly furthered the philosophy of religion. His chief service consists in having clarified to a considerable degree the problems of methodology. He was decisively influenced by William James, whose great work on religion he translated into German under the title, *Die religiöse Erfahrung in ihrer Mannigfaltigkeit.* Wobbermin sought for a method which would

[13] In his *Zur Religionsphilosophie. Aus Anlass des Buches von Rudolf Otto über "Das Heilige,"* Breslau, 1917.

[14] *Cf.* his *Aufgabe und Bedeutung der Religionspsychologie,* 1910; *"Die Methoden der religionspsychologischen Arbeit,"* in Abderhaldens' *Handbuch der biologischen Arbeitsmethoden,* Abt. VI, Teil 6, Heft I, Berlin, 1921; and his chief work *Systematische Theologie nach religionspsychologischer Methode* (1st ed. 1903): I. *Einleitung in die systematische Theologie; Prinzipien-und Methodenlehre im Hinblick auf ihre Geschichte seit Schleiermacher* (2nd ed. 1925); II. *Das Wesen der Religion* (2nd ed. 1925); III. *Wesen und Wahrheit des Christentums* (3rd ed. 1926).

enable psychology both to identify that which is specifically
religious and also to furnish the criteria requisite for a de-
cision concerning the truth of religion.   The possibility of
thus avoiding the Kantian alternative of *quaestio facti* and
quaestio juris he found in the method which he designates
religionspsychologischer Zirkel.   We should use our own
religious experience, we are told, as a key to the under-
standing of the religious life of others.   Having thus
sharpened our powers of discerning specifically religious
characteristics, we may return with improved understand-
ing to the observation of our own religious consciousness;
then we may continue to extend more widely and to de-
velop more intensively and inwardly this process of re-
ciprocal growth in the discernment, understanding and
interpretation of the manifestations of the religious life
of one's self and of others.   It is in this way that we may
hope to isolate, in their greatest possible purity, those
elements within the historical complexes of religious life
which are specifically religious.   The conclusions to which
this procedure leads Wobbermin correspond at many points
with those of Schleiermacher.   In his *Wesen und Wahr-
heit des Christentums,* Wobbermin attacks that difficult
problem of the unity of the rational and the non-rational
which likewise occupied Otto.   He endeavors to show that
the severe tensions between the temporal and the eternal,
immanence and transcendence, world and superworld which
entered into Christian theology did so in consequence of its
adherence to the doctrine of an historical revelation.

Martin Dibelius's *Geschichtliche und übergeschicht-
liche Religion im Christentum* (Göttingen, 1925) is con-
cerned with a distinction which corresponds to that be-
tween non-rational content and rational form.   Allying
himself with Wobbermin, Otto Hofmann published a work,

Der Begriff der religiösen Erfahrung in seiner Bedeutung für die Prinzipienfragen der Religionsphilosophie (Leipzig, 1921). He defines religion as "the living relationship to God," "the inward communication between the ego of man and the Thou of a personality whose activity is experienced as absolutely transcending the powers of man." In view of the fundamental difference between the religious relationship and all other experiences, Hofmann deems it impossible to determine the truth and the reality of the former through the rational means at the command of the human mind. In his essay *Das religiöse Erlebnis: seine Struktur, seine Typen und sein Wahrheitsanspruch,* he attaches himself to Wobbermin, whose ideas he at numerous points supplements and develops. Under the head of empirical sciences of religion in the best sense of the term we may place also Friedrich Heiler's comprehensive monograph, *Das Gebet* (Munich, 4th ed. 1924). As the author makes clear, he here subordinates the critical evaluation of religion to its empirical investigation. His aim is not to determine what must be the true meaning of prayer but, by a scrutiny of the most diverse forms of prayer and their motives, to understand the inner attitude and the spiritual purposes of the man who prays.

V

The literature just discussed more or less closely approximates to the so-called "phenomenological method" first developed by Edmund Husserl in connection with his logical attack upon psychologism. Among his disciples and students none has thus far applied this method more widely to the problems of the science of religion than the lately deceased Max Scheler. As early as in his treatise, *Der Formalismus in der Ethik und die materiale Wertethik,* we find the beginnings of ideas decisive for the philosophy of

religion. Scheler's turn from Kantianism to a Catholicism of an Augustinian cast then appears with entire clearness in his great collection of essays, *Vom Ewigen im Menschen* (Leipzig, 1921). To understand his conversion it is important to know that in his belief the very description of Catholic piety already presupposes the acceptance of Catholic dogma. Otto and Wobbermin maintain that personal religion is indispensable for an interpretation of religious phenomena. Scheler goes further still. In place of mere empathy into foreign acts of faith, he requires that one actually exercise them. Thus one directly grasps the religious object which at the hands of the former method (a method that in the last analysis remains psychologistic) dissolves into a "subjective category of reason." The essential feature of a religious act, according to Scheler, is to be found in the fact that "in its intention it transcends the world," namely, involves the "direct consciousness that by its very nature it may not be satisfied by any finite object belonging to the world or constituting it." Though it may be doubted whether Scheler's criticism does full justice to the real purposes of such thinkers as Otto and Wobbermin, one must nevertheless concede that it discloses fundamental weaknesses in their psychological method. The phenomenological unity of "act-meaning" and "act-object" from the very outset grants to genuine religious experience the reality of God. The "natural knowledge which one directly has of God or at any rate of the divine" thus renders unnecessary the Thomistic and neo-Thomistic doctrine of the mediate knowledge of God.

This contention of Scheler's has met with denial from the side of Catholicism. K. J. Geyser[15] insists that the

15 *Cf.* his *Max Schelers Phänomenologie der Religion,* Freiburg i. B., 1924; *Augustin und die phänomenologische Religionsphilosophie der Gegenwart mit besonderer Berücksichtigung Max Schelers,* Münster, 1923; *Intellekt oder Gemüt? Eine philosophische Studie über Rudolf Ottos Buch "Das Heilige,"* Freiburg, i. B., 1921.

phenomenological method leaves "unanswered the most important question of philosophy, namely, that of the existence of the religious object and the dependent question as to the truth of religion." As against Otto, he urges that intuition is "not an exact or scientific means for securing objective and universally valid knowledge." "The powers of the understanding suffice to afford a consciousness of God and to bring one to reverence and to dedicate one's self to Him, indeed even to cause one to quake in holy awe before Him." A similar neo-Thomism is espoused by Georg Wunderle and J. P. Steffes, while Johannes Hessen and Otto Gründler incline toward the Augustinianism represented by Scheler.[16] Gründler, to be sure, distinguishes three different forms of the knowledge of God and assigns the problem of the divine existence to that natural mode of rational "knowledge" which finds its completion in metaphysics.[17] The philosophy of religion proper, he maintains, is concerned with faith as "a supernatural mode of rational knowledge."

Along with Gründler's work, *Religionsphilosophie katholischer Theologie* by Erich Przywara, S. J. deserves careful attention. According to this writer the philosophy of religion is "the scientific reflection on the unity of religiosity and metaphysics as this actually exists in the naive and therefore pre-reflective experience." In the first part

[16] *Cf.* Wunderle's *Grundzüge der Religionsphilosophie*, 2nd ed. 1924; Steffes' *Religionsphilosophie*, Munich, 1925; Hessen's *Augustinus und seine Bedeutung für die Gegenwart*, Stuttgart, 1924, and *Die Religionsphilosophie des Neukantianismus*, Freiburg i. B., 2nd ed. 1924 Gründler's *Elemente zu einer Religionsphilosophie auf phänomenologischer Grundlage*, Munich, 1922.

[17] Among the many works discussing proofs for the existence of God may be mentioned: Ludwig Faulhaber, *Wissenschaftliche Gotteserkenntnis und Kausalität*, Würzburg, 1922; Bernhard Rosenmöller, *Gott und die Welt der Ideen: Gedanken zu Problemen der metaphysischen Gotteserkenntnis*, Münster, 1923; Andreas Inauen, S. J., *Kantische und scholastische Einschätzung der natürlichen Gotteserkenntnis*, Innsbruck, 1925; Franz Sawicki, *Die Gottesbeweise*, Paderborn, 1926; Friedrich Huhn, *Der Beweis vom Dasein Gottes*, Berlin, 1927; Eugen Rolfes, *Gottesbeweise bei Thomas von Acquin und Aristoteles*, Limburg a/L, 1927.

of his book he examines the attitudes of persons to God and thus comes to distinguish several types of religious-mindedness. Thus he seeks to lead up to an understanding of the fundamental principle of *analogia entis* in which the relation of the creator to the created reaches its true expression. While, to be sure, not all the contents of religion may be inferred from this principle, the latter nevertheless enables us "to understand the given contents as permeated by a single structural principle." The systematic section of Przywara's book also contains a thorough examination of non-Catholic doctrines. Following upon it is an historical account of the different methods that have been employed within Catholicism for establishing the truth of religion.

In his book, *Absolute Stellungnahmen. Eine ontologische Untersuchung über das Wesen der Religion* (Erlangen, 1915), Kurt Stavenhagen banks heavily on the phenomenology of Husserl. A distinction between the cognitive and the attitudinal aspects of an act of faith had been made by Gründler in an earlier work. Stavenhagen now defines religious attitudes as those which incorporate reverence and love in an all-inclusive and supremely exalted form and which therefore deserve to be called absolute attitudes. Robert Winkler[18] likewise adopts Husserl's act-phenomenology but he undertakes to combine this with the transcendental method of Rickert. In so doing he deliberately approximates to Wobbermin's method. He discerns in the latter "a valuable point of departure for all future investigation" directed towards a systematic theology of a philosophic type. In a more recent volume, Wilhelm Koepp,[19] attaching himself to Wobbermin, Winkler, Husserl and Rickert, develops an inductive, realistic meta-

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[18] *Cf.* his *Phänomenologie und Religion*, Tübingen, 1927.
[19] *Cf,* his *Panagape: Eine Metaphysik des Christentums*, Gütersloh, 1927.

physics. But here again philosophical methods are consciously transformed so as to take into account theological presuppositions and aims.

VI

The religious philosophy of Protestant theology in the main still continues to follow in the paths of Kant, Schleiermacher, and Ritschl. Among those who have striven to build further on the foundations of the Kantian philosophy, special mention belongs to Julius Kaftan. The aim of his book *Philosophie des Protestantismus: Eine Apologetik des evangelischen Glaubens* is to confirm faith —that is, its conceptual form, not its content—through philosophy as "the effort of the human spirit to comprehend itself." Beginning with a critique of the Kantian epistemology and an analysis of the moral consciousness, Kaftan proceeds to describe religion as "knowledge *sui generis,*" namely, as a "knowledge of the absolute" derived from the certainty of one's own life. In spite of his appeal to Kant and his renewal of the method of establishing religion on moral foundations, Kaftan comes to results that diverge significantly from those of Kant, especially as concerns the nature of faith and of revelation.

Somewhat closer to Kant is Wilhelm Koppelmann.[20] The latter likewise differentiates sharply between the theoretical and the practical reason, and he connects religion with the latter. Koppelmann rejects all non-rational views (such as those of Schleiermacher and Otto) and refuses to separate religion from morality. Christianity, especially, he interprets as a "thorough-goingly rational religion" and "pure moral consciousness." The specific nature of religion, however, was far more successfully exhibited by

[20] *Cf.* his *Das Wesen des Christentums: Eine religionsphilosophische Untersuchung,* Berlin, 1922.

Rudolf Eucken, whose numerous works freely transformed the philosophy of Kant and developed it into a comprehensive theory of the spiritual life. Eucken on the one hand distinguished between the "universal" and the "characteristic" aspects of religion, that is between religion's attempt to vindicate itself within culture and its tendency to become increasingly internal and thus to transcend culture; the unity and inseparability of these features of religion, he however likewise affirmed. Thus he succeeded in setting forth the autonomy of the religious life more concretely and more aptly than could the systematic formulations of traditional Kantianism and of the Ritschlian school.

The theology and religious philosophy of Protestantism was in turn significantly influenced by that branch of neo-Kantianism which is commonly known as the southwest-German or the Baden school. Its founder was Wilhelm Windelband, the well-known historian of philosophy; its most influential representative is Heinrich Rickert. Windelband's essay on *"Das Heilige"*[21] takes as its point of departure the antinomy between the "ought" and "being," the normative and the actual, which pervades all the regions of our rational life. Human history ever and again records the courage of individuals who proclaim the demands of "conscience," of "nature," of "God," in opposition to the valuations thitherto universal. Because the criticisms of this "normal consciousness" are of an essentially hyperempirical character Windelband concludes that "conscience" is not a mere expression of the social consciousness but that its sources lie deeper. "In this sense conscience presupposes the metaphysical reality of a normal consciousness—a mode of reality, of course, which

[21] This is to be found in the collection of essays entitled *Präludien,* 5th ed. 1916. *Cf.* also Windelband's *Einleitung in die Philosophie,* 3rd ed. 1923. Resembling closely the views of Windelband and Rickert are those of Jonas Cohn in his *Religion und Kulturwerte,* Berlin, 1914.

differs from the empirical. Once we call to mind the validity of absolute values, we realize that conscience is the most certain of all our experiences, and it is precisely in this sense that the normal consciousness is the holy experienced as transcendently real." "Religion is transcendent life; its salient feature is a mode of life that carries us beyond experience, a consciousness of membership in a world of spiritual values, the refusal to content oneself with that which is empirically actual." In Rickert's system of value philosophy likewise, religious values are differentiated as those that "pass beyond the human sphere." Everything human as such proves itself to be imperfect. We may call it imperfect, however, "only on the presupposition of a superhuman value by reference to which man's perfection is judged. Thus the human, as the imperfect, implies the perfect, not indeed as a reality but yet as a valid value." This philosophical conclusion corresponds with the "most universal of the fundamental convictions of religion." Religion, however, does not stop at affirming the "validity" of the holy value but passes on to faith in a "real" good, God, corresponding thereto, because it is only "the superhuman power of this value over reality" that affords a certainty of its realization.

Rickert sharply sunders religion from mysticism. Georg Mehlis,[22] on the other hand, thinks of the mystical feeling as the central feature of religion. According to him it is only "in mysticism that the religious phenomenon finds its completion"; it is only in "fusion and unification with a non-rational and divine reality" that the deepest longing of the religious feeling attains its true satisfaction. Of importance is likewise the way in which Mehlis secures an approach to the philosophy of history through his treat-

[22] Cf. his *Einführung in ein System der Religionsphilosophie*, Tübingen, 1917; *Die Mystik in der Fülle ihrer Erscheinungen in allen Zeiten und Kulturen*, Munich, 1926; and *Lehrbuch der Geschichtsphilosophie*.

ment of the problem concerning the realization of the valid values. The result is that he incorporates the philosophy of history within religious philosophy. Similar ideas are to be found in Fritz Münch's *Erlebnis und Geltung* (Berlin, 1913).

In its struggle against psychologistic views, Protestant theology linked itself to the critical philosophy of Windelband and Rickert. The latter appeared to render secure a realm of unconditionally valid values. Ernst Troeltsch, the most important of the earlier theologians here in consideration, though according full recognition and appreciation to the psychology of religion in its effort to determine the facts of religion, defended the transcendental method in opposition to the psychology of European and American thinkers. Not at all points, however, did he agree with the school of Windelband. The latter described the "holy" or "divine" as the unitary basis of the normative consciousness but as contributing no essential content thereto. Troeltsch, on the other hand, under the influence of Schleiermacher and Ritschl, reached out for a "religious *a priori*" as an independent and thoroughly original function alongside of or above the other functions of the mind. In describing the content of this rational principle which he asserted as productive of religion, Troeltsch uses the words, "the reference of all that is actual to an absolute substance." This does not carry us far beyond the position of the value philosophy. Troeltsch himself became clearly conscious that such a rational anchoring of religion is unsatisfactory. Hence he subsequently sought another solution which might do fuller justice to religion's claim to transcendence and might bring the formal concept of the absolute into living connection with the concrete wealth of relativistic actualities. This goal could not be reached by the path of empirical and historical knowledge. Thus

the problem of the unity of Idea and revelation, of rational necessity and "contingency," caused the philosophy of history to enter ever more decisively into the focus of Troeltsch's thought. But in this field also he was unable entirely to escape the alternative of dogmatic absolutism or skeptic relativism. Nevertheless his last publications on historicism brought a certain completion to his life's work. As a principle superior to a static system of values ever exposed to the solvents of history, he adopted the concept of a "creative cultural synthesis" which insures a dynamic mastery of antitheses through responsible personal decisions.

In a discussion of Troeltsch's doctrine of the religious *a priori* Robert Jelke[23] contended that Troeltsch did not adequately distinguish between "the rational necessity of forming religious conceptions" and the "proof for the existence of the religious object." Jelke opines that the question of proof may be settled only by reference to a specific revealed religion, that is, to a scriptural theology. In his recent book *Religionsphilosophie* he again seeks to show "that the *a priori* must be understood simply as a purely *formal* capacity whereby man takes hold upon that which is objective and must be supplied by the history of revelation; and that the *a priori* therefore affords no decision respecting the question of religious truth." Thus in Jelke we detect the echoes, beyond Luthardt and Ihmels, of a confessional theology. In the case of Karl Heim, on the other hand, we discover the influences of a biblical theology transmitted through Kähler; and Schlatter, though his chief work, *Glaubensgewissheit,* likewise reflects the thought of Rickert. This book was considerably modified a number of times so as to bring out more sharply its

[23] *Cf.* his *Das religiöse Apriori und die Aufgabe der Religionsphilosophie: Ein Beitrag zur religionsphilosophischen Position Ernst Troeltschs,* Gütersloh, 1917.

fundamental thesis. The whole of Heim's thought is dominated by the problem of contingency. For him the fundamental character of reality is its incalculability. Everything definite has its source in a decision of a personal will. This is true also of the world as a whole. Its meaning and goal we learn through revelation. But faith in revelation acquires certainty only if one hazards a free decision such as the Christian makes in favor of Jesus Christ.

In his *Religionsphilosophie* Heinrich Scholz likewise contends that the basis of our certainty that religion affords a genuine experience of a divine reality is in the last analysis a "philosophical confession." For the truth of religion may in no wise be demonstrated, inasmuch as it lays claim to establishing a connection with God that transcends all human caprice and is grounded in revelation. It is from the "entirely other," "non-terrestrial" character of its exalted experience that the "self-consciousness of religion draws its conviction that, in the forum of religious philosophy, religion may be justified at most when appealing to the claims of morally earnest thought.

Scholz draws a sharp line between religion on the one hand, and metaphysics and the remaining cultural creations on the other. Thus we are led to a problem which at present occupies theology and the philosophy of religion as does scarcely any other; that as to the relation of religion and culture, or, otherwise put, of "Christianity and idealism." In comparison with it the older problem of faith and knowledge, the problem which grew out of the antinomy between the world-view of natural science and that of religion, has receded quite into the background. True, Arthur Titius made an "attempt at a reconciliation of natural science and theology" in his book, *Natur und Gott.* Quite apart from the extent to which its argument possesses the power of conviction, it did not at all seem to meet

a living issue such as did similar works only a few years ago. K. Dunkmann[24] finds in philosophical idealism only "a proof of the inadequacy of human thought, feeling and will." Only religion, he holds, can carry us beyond the opposition of idea and the actualities of nature. Thus, ideas closely resembling those of Windelband are transformed in the direction of a theological dogmatics. W. Lütgert,[25] in an historical investigation, also seeks to show that German idealism from the very beginning harbored germs of inner dissolution in that it attempted the impossible synthesis of Hellenism, German mysticism, and the Enlightenment.

The strongest impulse, however, to the battle against idealistic philosophy and the joy in culture exhibited by modern Protestantism came from a theological movement whose historical source was the dialectical philosophy of religion of the Danish thinker Sören Kierkegaard. The ideas to which we refer were given preliminary statement by a number of Swiss theologians, such as Franz Overbeck; after the War they were developed and defended with extreme polemical skill by Karl Barth, Friedrich Gogarten, Eduard Thurneysen and Emil Brunner.[26] They are directed primarily against the humanistic phase of Protestant theology, against the anthropological and ro-

[24] Cf. his Idealismus oder Christentum, Leipzig, 1914; Metaphysik der Geschichte, Leipzig, 1914; Systematische Theologie: Vol. I, Religionsphilosophie, Gütersloh, 1917.

[25] Cf. his Die Religion des deutschen Idealismus und ihr Ende, Gütersloh, 1925.

[26] The following works here require mention: Barth, Karl: Der Römerbrief, Munich, 4th ed. 1924. Gogarten, Friedrich: Illusionen, Eine Auseinandersetzung mit dem Kulturidealismus, Jena, 1926; Die religiöse Entscheidung, Jena, 2nd ed. 1924; Glaube und Wirklichkeit, Jena, 1928. Thurneysen, Eduard: Dostoievski, Munich, 1922; also Barth and Thurneysen, Komm, Schöpfer Geist, a collection of 25 sermons published at Munich in 1924. Brunner, Emil: Religionsphilosophie evangelischer Theologie, Munich and Berlin, 1926; Die Grenzen der Humanität, Tübingen, 1922; Erlebnis, Erkenntnis und Glaube, 3rd ed. Tübingen, 1923; Die Mystik und das Wort, Tübingen, 1924.

mantic character which the latter acquired through Schlei-
ermacher and has ever since maintained. Opposing all
such attempts to establish religion from the side of man,
they stress the Paulinian doctrine of "offence" and of
"foolishness," along with Tertullian's *credo, quia ab-
surdum,* Luther's and Calvin's principle of faith, and
Kierkegaard's teaching of the "paradox." Religion, it is
contended, is not the completion and synthesis of culture,
but its antithesis and "crisis," that is, the divine judgment
and a radical questioning. For religion, "insofar as it is
construed from the side of man makes the claim of bridg-
ing from the side of the creature an opposition that is ab-
solute, namely that between creator and creature."

It would be superficial to see in the contentions of the
dialectical theology nothing more than intellectualistic ex-
aggeration and ideational construction, and to miss the
deep, genuine religious pathos which surges within it as
its moving power. Very justly has it been said of these
theologians that "their apparent joy in anarchy . . . .
is born of a keen and honest anxiety regarding religion."
"Not God is questionable, but we human beings are so, and
most of all so is our religion and our piety from the side of
God," we are told by Gogarten.

What revealed to these thinkers the dangers of cultural
optimism, historicism, idealism, and relativism, was in an
important measure the catastrophe of the War. These
movements attempt to reconcile God and the world, the here
and the beyond, either through identification or through a
relation of continuity. Between the eternal and the tem-
poral, however, there is a chasm which, in the belief of the
"crisis" theologians, may be spanned alone from the side of
God, through the redeeming word of His revelation. For
this reason their philosophy of religion also begins with
revelation and with faith therein; it does not simply lead to

them. Brunner describes his philosophy of religion as "a part of Christian theology." "Christian faith does not deny the existence of a certain universal knowledge of God, both religious and philosophical; on the contrary, it presupposes this. What it does deny is that the living personal God may universally be known through the possibilities resident within the world and in the human spirit in general. It contends that the living personal God may be known only through personal experience of Him, through His personal word, through this unique event"—the event, namely, of the divine self-revelation in Jesus Christ.

The theology of crisis continues to be strongly contested. Its effects and countereffects within theological science as such do not here concern us.[27] As respects the development of the philosophy of religion proper, it has not been without considerable influence. It has directly attacked those problems which at present are in the focus of all discussions of religion. This is best and most clearly exemplified by Paul Tillich's *Religionsphilosophie,* a book which the author has supplemented by a large number of other publications. After a penetrating critique of all earlier methods of the philosophy of religion, he is led to the "metalogical method" as that which synthesizes and deepens the others. The aim of this method is first of all to overcome the opposition of form and content in order to do justice, in their dialectical relations, to both aspects of concrete experience. It alone seems to be really capable of satisfactorily defining the systematic relation of culture (as "concerned with the conditioned forms and their

[27] A brief but admirable exposition of the dialectical theology may be found in Max Strauch's *Die Theologie Karl Barths,* Munich, 2nd ed. 1924. Critical of the movement are: Bernhard Dorrics, *Der ferne und der nahe Gott. Eine Auseinandersetzung mit der Theologie Karl Barths,* Gotha, 1927; Erich Schaeder, *Das Geistproblem in der Theologie,* Leipzig, 1924; Rudolf Köhler, *Kritik der Theologie der Krisis,* Berlin, 1926; Kurt Leese, *Der deutsche Idealismus und das Christentum,* Berlin, 1927.

unity") and religion (as "concerned with the unconditioned content of meaning"). They join at the point where they alike stress "unity of meaning"; but even the completed synthesis of the forms of the spirit can be nothing more than a symbol from the standpoint of the absolute ground of meaning. For every "form" would annul the inner infinitude of the ground of meaning; the latter, however, must be inexhaustible. "Only that which is the abyss of meaning can be the ground of meaning. All else hovers at the brink of the abyss of meaninglessness." Thus introducing a "critical paradoxy," Tillich strips the dialectical theology of its barren, supernaturalistic features, and utilizes its fruitful ideas. Though exhibiting a certain approximation to mysticism and numerous similarities to speculative idealism, he sharply sunders himself from them both. He criticises Hegel for having identified the self-complete absolute spirit with God instead of regarding it as merely a symbol for the latter.

VII

Tillich thus opposes himself to all those thinkers who have revived in any form the philosophy of identity. If, however, we would judge the many different attempts within recent German philosophy to pass beyond psychologism and positivism and to develop, in the direction of Fichte, Schelling and Hegel, the critical idealism inspired by Kant, we must inquire who, in the sphere of the philosophy of religion, is really affected by the criticisms of Tillich.

The identification which is scourged must find expression in the fact that philosophy and religion become merged or that religion becomes entirely submerged within a speculative and metaphysical philosophy. In such cases we

may no longer really speak of a philosophy of religion proper; to do so, religion must be granted a certain independence and an inalienable uniqueness, such as Hegel *intended,* at any rate, to give it. Unquestionably this is still the position of Hermann Schwarz's book, *Das Ungegbene* (Tübingen, 1925). Its point of departure is Fichte and German mysticism, especially Eckhart. By a remarkable analogy between the divine and the Cantorian transfinite number "ω" the unbridgeable gulf between God and the creature is strongly emphasized in a manner already indicated by the very subtitle of his later work, *Gott. Jenseits von Theismus und Pantheismus* (Berlin, 1928). Friedrich Brunstäd[28] likewise expressly emphasized the unity and interconnectedness of religion and culture, and the tendency of the former to realize values, while he yet, in spite of a certain Hegelian influence, did not deny religion's claims to independence and transcendence. In contrast hereto Arthur Drews,[29] a student of E. von Hartmann, formulated a religion of identity distinguishable from that of Hegel only in that it construes human salvation not as the mere consciousness which man may have of his identity with the divine self but solely as man's dedication of himself to the divine. "Substantively, God and man are identical; functionally, however, they are distinct."

This resolution of the religious-metaphysical dualism, which has so often occurred in specifically theological

[28] *Cf.* his *Die Idee der Religion. Prinzipien der Religionsphilosophie,* Halle, 1922. Richard Kroner (*Die Selbstverwirklichung des Geistes,* Tübingen, 1928) likewise objects to Hegel's dissolution of religion into philosophy. For Ludwig Coellen, on the other hand (*Von der Selbstoffenbarung des göttlichen Lebens,* Darmstadt, 1924) philosophy in the era of the immanent world-concept is the form in which the divine spirit comprehends itself as process. William Stern develops his interpretation of religion from the standpoint of a personalistic metaphysics as this is developed in various parts of his *Wertphilosophie,* 1924; reference may be made to *Person und Sache: System des kritischen Personalismus,* Vol. III, Leipzig, 1924.

[29] *Cf.* his *Die Religion als Selbstbewusstsein Gottes,* Jena, 1906.

thought, into a correlation of aspects of the world consciousness or the absolute spirit, finds expression also among representatives of that philosophy of life which has its roots mainly in Nietzsche and Bergson. Most prominent among its representatives is Georg Simmel.[30] His book, *Die Religion,* appeared earlier than most of the literature which here concerns us. It later, however, received expansion and elaboration in a number of other stimulating essays. Religion for Simmel is an original movement of the soul, which, like other functions, posits a unique form of objectivity, namely, the transcendent creations of faith. Not in the latter, however, but in the being of the soul itself should we seek the meaning and value of the religious attitude. This attitude, therefore, is independent of the existence of the contents of faith. Hence the future of religion, according to Simmel, depends upon whether or not religion, after thrusting aside the question as to the existence or non-existence of the realities believed in (that is, the "transcendent fact of God in his otherness to the world"), may give its creative energies a new orientation, directed upon the religious nature of the soul itself.

More radical still are the thoughts of Leopold Ziegler.[31] For him the history of Occidental religions is a record of gods whose forms are born ever anew only to meet their doom. They spring from the irrational depths of the inner man, as external symbols of man's own mysterious nature. They perish through a process of rationalization which deprives them of their content and their value. In a future just now dawning, they will be sacrificed once and for all,

[30] *Cf.* his *Die Religion,* Frankfort a. M., 2nd ed. 1912; also his essays, *"Die Persönlichkeit Gottes"* and *"Das Problem der religiösen Lage,"* Leipzig, 2nd ed. 1919; *Lebensanschauung. Vier metaphysische Kapitel, Munich,* 2nd ed. 1922.

[31] *Cf.* his *Vom Gestaltwandel der Götter,* Darmstadt, 3rd ed. 1922, and *Der ewige Buddha,* Darmstadt, 1922.

because they stand in the way of the real urge and meaning of religious life, namely, the self-deification of man. Not alone Ziegler but also Dietrich Heinrich Kerler, Nicolai Hartmann, and Max Scheler in his last works exhibit strong Nietzchean influences, these in the case of Scheler being still fused with the pantheism of a Spinoza and a Hegel.[32] Writes Scheler: "Original Being becomes conscious of itself in man. . . . . . The place . . . . . . of this self-realization, or as we may say self-deification, ... is man, the human self and the human heart." "For that half childish, half weakly distant relation of man to God as it occurs in the objectifying and therefore separating relations of contemplation, of adoration and of petitional prayer, we substitute the elementary act of the personal outreach of man to God, a self-identification with this spiritual act in all of its phases."

Thus the thinkers just mentioned are antipodal to those espousing the dialectic theology. The two groups look in opposite directions for their solutions of the problem of immanence or transcendence. Their extreme positions cause either the philosophy of religion to be entirely surrendered to theology or religion to be delivered unreservedly into the hands of speculative metaphysics—though Tillich, to be sure, made a resolute and fruitful attempt to avoid this alternative by the aid of a new method of approach. Now the problem of transcendence is obviously connected closely with that of the systematic structure of philosophy as a whole. Hence earnest attention to the latter in constant reference to the former is a necessary task for the philosophy of religion. This was undertaken by the philosophers of the so-called Marburg school. Their leaders were Hermann Cohen and Paul Natorp. The works

[32] *Cf.* Kerler's *Weltwille und Wertwille*, Leipzig, 1925; Hartmann's *Ethik*, Berlin, 1926; Scheler's *Die Stellung des Menschen im Kosmos*, Darmstadt, 1928.

of these writers go back in large measure to an earlier time than now concerns us—particularly so their treatises in the philosophy of religion. We must, however, briefly refer to their essential doctrines inasmuch as these constitute the basis for the final views of these writers and prepared the way for the work of Albert Görland and Ernst Cassirer.

Cohen's first treatment of religious problems occurs in his *Ethik des reinen Willens*. Here he seeks to show that an ethics which follows the transcendental-critical method of Kant, in its aim to be a philosophical doctrine of principles involved in law and political organization, requires the concept of God, not indeed as its basis but yet for its systematic completion. The significance of this concept lies in the fact that it in principle "re-establishes the harmony between our morality and our nature." Cohen's small treatise *Religion und Sittlichkeit* (Berlin, 1907), which appeared three years later, supplements these reflections. But it was only his chief work in the philosophy of religion, *Der Begriff der Religion im System der Philosophie*[33] (Giessen, 1915) that furnished a comprehensive, systematic and assured foundation to religion. The latter can be discovered only as "idea." That is, it must be "created *a priori*"; its source must be in "pure" consciousness as a whole. Thus it becomes a problem whenever one undertakes to erect a systematic philosophical structure. The question as to the place of religion within the system of culture as a whole, is rendered difficult through the fact that cognition, will, and feeling exhaust "the phases of consciousness that create the content of culture." Hence

[33] See also Cohen's *Die Religion der Vernunft aus den Quellen des Judentums*, Leipzig (now Frankfort a. M.), 1919. Along with Cohen's writings on the subject, Rosenzweig's *Der Stern der Erlösung* (Frankfort a. M., 1927) forms an interesting and important contribution to the religious philosophy of Judaism.

religion (in contrast with ethics, for example) may not lay claim to independence, but only to "uniqueness." In so contending, however, Cohen goes an important step beyond his earlier position. The uniqueness to which he refers appears clearly in his proof that the God-idea is of essential importance for all members of the system of ideas; the latter have their basis in the unitariness of God. Particularly intimate is the bond between religion and ethics. In ethics the God-idea arises, on the one hand, from the postulate that nature satisfies the conditions for an infinite "progress of human morality," and, on the other, from the inherent need that the God-concept thus reached be expanded in such wise as to take account of the needs of the individual. The religious thought of God imbues man, in his sinful isolation, "with the confidence of his personal emancipation from guilt and penalty, and of his restoration to the tasks of ethical freedom." "Thus the God of forgiveness, of redemption and of reconciliation is not, as it were, a myth, but is a necessary completion of the God of ethics and makes possible that emancipating work of the individual which would lose its meaning were not God endowed with mercy." Throughout, Cohen brings the unitariness of God into correlation with unitariness, whether that of being or that of man in his individuality. Indeed, once we envisage the danger of emotionally engendered pantheism, the psychology of human culture makes it clear that "the real task of religion" is "the saving of the individual," as also that of God. "God also as well as man must be preserved. This is the ultimate meaning of religion."

It is with reference to "the unity of consciousness" and "the basic power of feeling" that Paul Natorp's philosophy of religion must come to terms with that of Cohen. It is feeling with its inner infinitude that Natorp considers the source of religion in the consciousness of man. Feeling is

"the inwardness of the psychical life, the real in-itselfness of the soul," "which precedes and determines the form which one gives to any object." Feeling is always richer and deeper than any particular formulation of objective contents, whether of knowledge, of will, or of imagination. Hence that which religion designates as "the feeling of the infinite" is in truth the "infinity of feeling." This its own richness and limitless plenitude feeling objectifies as "the infinite," and thus it comes into conflict with such other types of objectification as are infinite only in the sense that ever further advance is required. Hence religion must renounce all claims respecting transcendence. Religion may be "retained only insofar as it keeps within the limits of humanity." Only within these limits may it reveal its complete significance for the development of a human culture. It intensifies both the collective consciousness of mankind and man's confidence in his ability to carry through his tasks in the world. Through the emotional experience of the connection of all with all, it likewise brings "subjectivity as such to the most determinate and most significant expression of which it is capable." Here, as Natorp writes in his *Sozialidealismus,* we find "the unconditioned coincidence of the unconditioned individual with the unconditioned universal; in the language of religion . . . . . . the unification of the soul with God, and of God with the soul." This passage, however, is extracted from a work written considerably later than the one from which we quoted above. In this latter work, as in other writings of Natorp's last period, we may detect a firm determination to accord to religion, in a form related to mysticism, a more complete and decisive recognition than the author had previously given it.

The execution of this purpose within the systematic framework of critical idealism was seen to require the

discovery of a *sui generis* factor of consciousness that might serve as a basis for religion. This alone would make it possible to regard religion not merely as a unique orientation within the totality of objective experience but also as a region of experience possessing a value and a type of law all its own. This important step was taken by Albert Görland's *Religionsphilosophie als Wissenschaft aus dem Systemgeiste des kritischen Idealismus* (Berlin and Leipzig, 1922). Görland follows Cohen in rejecting feeling as the original religious phenomenon. This latter must be found in divination, in the meaning which F. H. Jacobi attached to the term *Ahnung*. The concept involves the severe tension between the correlative aspects of religious experience, namely, that transcendence of God which is at once at the opposite pole from the ego and is yet in reciprocal relationship with it. Such a transcendence may not be conceived as absolute. It is a "polar transcendence" of God and the ego, of the ego and God; or, to refer to the Old Testament, that distance of God which is likewise His nearness. It is precisely this "polar transcendence" which, on the one hand, brings religious experience into the closest relation with the other fields of consciousness, so far as concerns systematic and methodic considerations, while it yet, on the other, carries religion so far beyond all other modes of experience that in it the "bounds of humanity" appear to be burst. In this latter quality, to be sure, humanity itself, in its most essential character of limitedness and meaninglessness—as the ego in the loneliness of his "unitariness"—becomes the absolute limit of a new meaning-reference, namely the "divination of God." In another way also Görland connects very closely the problem of transcendence and immanence with that of systematic philosophical construction in general. The transcendence motive is described as the factor con-

stitutive of system as a whole, and "polar transcendence" is said to guarantee the "complete immanence," not of God, but of all experience.   Thus the transcendence claim of religion, which at first blush seems hostile to systematic construction, becomes, upon a critical evaluation of its function, the condition of the possibility of religious experience.   The latter, in turn, by overcoming the complete accidentality of logical, ethical, and esthetic experience, becomes the decisive factor whereby religion establishes its place within the cultural consciousness as a whole.   However, "the philosophy of religion as the fourth member of a system of critical philosophy" never strikes beyond these limits, but maintains itself in a methodical correlation with the special sciences of religion.

In the case of Görland, systematic problems receive the major attention.   Ernst Cassirer, on the other hand, whose philosophy of religion, in the narrower sense of the term, is given in the closing chapter of the second volume of his *Philosophie der symbolischen Formen,* also gives broad consideration to historical problems.   He presents a rich fund of historical, ethnological and philological facts.   These he utilizes in order to differentiate the typical ways in which mythical ideas are formed.   His aim is thus to incorporate mythical thinking within the sphere of "mental energies"; in consequence hereof, the inner and the outer, "the ego and the world," become differentiated as the original correlatives within consciousness.   A deeper understanding of the myth enables one to draw a new and a sharper line of demarcation between it and religion.   "Despite the fact that the *contents* of myth and religion are inextricably interwoven, their *form* is not the same."   The uniqueness of the form of the specifically religious consciousness expresses itself in its distinctive attitude towards the pictorial world of the myth.   "When religion utilizes sense images and signs as

such, it knows them to be what they are, namely, means of expression which, even when revealing a certain meaning, are nevertheless incompetent to do it justice. They point to this meaning without ever completely grasping or exhausting it."

If, now, we cast a backward glance at the total work of the past decades in the philosophy of religion, we cannot escape the impression, that, in spite of significant contrasts and contradictions even in fundamental matters, all the various currents of thought tend to converge. In a measure this is due to the very laws of thought, but it is none the less to be interpreted also as an expression and as the result of freely formed judgments.

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EMOTION AND PATTERN IN AESTHETIC
EXPERIENCE

THERE is a tendency for the terms matter and form
to take one another's places in different writers on
aesthetics, which is due partly to their inevitable relativity
as the determinable and its determination; since, that is,
they never exist in their absolute meaning of pure indeter-
mination and pure determinateness. But further there are
at least three different senses in which the potentiality of a
work of art may be understood, which are often confused.
These are 1, its physical matter; 2, its conceptual matter;
3, its emotional matter. I propose to call the first medium
or material, the second subject-matter or meaning, and the
third content.

Thus we obtain three pairs of derivative distinctions.

1. Material and shape. The actual paints, musical
notes, marble, etc., are determinable in an indefinite num-
ber of ways; their determination is the particular spatial or
temporal shape into which they are got.

2. Subject-matter and treatment. The pre-existing
determinable or matter here is mental; it consists of mem-
ories, sensations and concepts, whose treatment is their de-
velopment into a given system or articulation of meanings.
Form here, namely, is the way in which the meanings are
ordered so as to contrast with and bring out one another.

3. Emotional content and bodily pattern.

Here, since this seems to me to be the aesthetically important sense of the term matter, a fresh beginning has to be made. The artist, then, starts with an emotion; the secret of his energy is precisely that an emotional state *of itself* tends to flow over into some sort of expression. Physiologically an emotion is a state of peculiar bodily tension which of itself flows over into overt movement. But an emotion is also an obstacle to expression, and this too has its well-known physiological description. For an emotional state of sufficient intensity interferes with or completely inhibits the performance of the appropriate movements. It is then a diffused disintegration of the bodily machine, in which its parts as it were assert their independence; a revolt in which the muscles pull one against the other chaotically; it issues in trembling, shuddering, gasping, pallor, sobbing, incoherent cries and so on. Further, left to itself this tension mechanically augments till it reaches the pitch of hysteria or paroxysm. A paroxysm which roughly speaking is always the same, and this is another reason why bare, concentrated emotion is an obstacle to expression, or the communication of exact shades of feeling: for nothing is more like the crisis of a passion than the crisis of another passion.

This bodily tumult may either work itself out through its climax to exhaustion (a process which we feel to be degrading and unlovely, essentially inhuman); or it may find release in some instinctive pattern of movements, or, finally, and this is the case that interests us, it may be appeased by the imposition upon the body of a strongly outlined and deliberate attitude. As Burke pointed out, "to dispose the body in a certain way" is to excite an appropriate change of mental state. Campanella, it appears, claimed that he could discover a man's innermost thoughts by a sufficiently careful imitation, in his own body, of the oth-

er's attitude, gestures, etc. The man who drowns his sor-
rows in drink does so, Burke says, by "putting his body in
a different disposition" in which the undue tension of nerves
which is his pain becomes impossible. Now of course to
besot oneself with drink is not to create a work of art;
but the artist's procedure is in one respect resembling: he
too proceeds by altering the "disposition" of his body, only
what he does is to impose upon it a complex and expert
pattern of motions with the result that the bodily tumult is
definitely appeased (not simply postponed till the morning
after). The parallel with the sorrow-drowner lies in this,
that both he and the artist recognize that their emotions are
not to be subdued by a pure effort of will, nor by philosophi-
cal reflection and thought, but by cunning, by deliberately
altering the posture and disposition of the body itself; be-
yond this, the parallel ceases. Here, it may be noted, is a
practical dualism which all can experience for themselves:
certain bodily states, namely states of emotional disintegra-
tion cannot be directly met by the mind; we can experience
this impotence. But they can be met by imposing on the
body some type of motion which is novel, or not directly
relevant to the situation, the body integrating or as it were
canalizing its diffused activity about this new element of
order, this pattern. We experience this too; we are pro-
foundly aware, I imagine, of the childish body we carry
about with us, so easily engrossed, so automatically subject
to distraction.

We have seen so far the essentially double nature of
emotion as a factor in art, namely as the fundamental driv-
ing-force, and at the same time as the greatest single ob-
stacle to expression. The way out of this apparent impasse
is through the subterfuge above described—that is, I should
say through form (understood here as bodily pattern).
When namely salvation, release, sublimation, purgation—

or whatever other word you care to use—has been attained, when the bodily forces have re-formed themselves about the nucleus of order let down among them so to speak on the end of a string, the resulting creation or work of art *expresses,* we say, the emotional state whose energy and vitality it has succeeded in capturing. Only there is an important qualification needed to make this language more precise: the work of art expresses not just an emotion, but an emotion which, as we have seen, has been dominated.

We are already in sight of a method of describing the arts, i.e. as one form or another of the dance. Also in sight of a conclusion which is that aesthetic salvation, like other kinds of salvation, is through form alone. But the whole argument so far needs to be repeated at a lower level of intensity than that of the passions and emotions, namely at the level of imagination.

Those who equate "imagination" and "imaginativeness" with aesthetic worth, without ever once inquiring whether the imagination may not be a positive obstacle to be overcome by the artist, as well as being a condition of his creative energy, simply pay themselves with a word. Turn to the traditional French account of imagination as you get it in Montaigne, Descartes, Pascal and Malebranche, and you may find some reason to suspect this "Mistress of Illusion"—Montaigne's *"folle du logis."*

Here we start with the bodily machine relaxed, rather than tense. In the state of idleness, revery or dreaming the body is metaphorically speaking disconnected from the world of real objects and actions, but the machine does not cease to function because thrown out of gear. In Descartes' language, the animal spirits keep coursing around and around the same traces in the brain, deepening and enlarging them. And the conscious correlate of this mechanical repetition is an illusory world of the imagination,

which seems to be more real than the real world itself. Thus Malebranche says the more you imagine a large thing, like a mountain, the larger it gets, till at last it becomes overwhelming. The unrelievedly cheerful world of the faithful Couéite, or the melancholy world inhabited by the victim of persecution mania may be taken as examples of the power of deception latent in the bodily machine. For this purely mechanical repetitive or cyclical process sets up an artificial state of tension, which just like a state of passion tends to overflow into action. To quote Burke again in his admirable "purgation theory," "in this languid and inactive state (of relaxation) the nerves are more liable to the most horrid convulsions than when they are sufficiently braced and strengthened." The truth about art, far from being that it is an "escape from reality through the creation of an imaginary world," is that it is an escape from the monotonous tyranny of imagination (as a function of the "machine") back to the real world through the integrating agency of deliberate bodily patterns.

Dreams and revery are not aesthetic facts, because they are unreal; there is nothing there beyond a more or less "horrid convulsion" of the nerves, that is a diffused, almost disembodied emotional state. Now it is of course because the dreamer takes his dream too seriously that it is an illusion. Namely he takes a vague emotional state to be some indescribable or ineffable meaning. Consider how interesting one's own dreams are (if one was not always forgetting details!) and how tedious those of others. In the endeavour to communicate a dream who shall say that he has not been guilty of dressing it up, claiming to have experienced far more than he can be sure of having experienced? The opium eater with his disappointingly dull dreams is a type. These extravagant and at bottom meaningless fancies mask a mechanical ex-

altation which is unreal in every sense except in the purely
physical sense that violence has been done to the body by
tearing it out of its normal context of relatedness to the
real world. No: dreams, reveries, pure imagination are
not even the material of art, for art is fundamentally a
social, that is a common product, and the incommunicable,
the irremediably subjective is forever excluded from it.
The work of art arises, I repeat, when the sterile process
of imagination is brought under control, directed, given an
objective pattern of ordered motions about which to inte-
grate itself, to actualize itself.

The sufferer from stage fright is your "imaginative,"
your romantic. The image of the boundless multitude of
selves, with himself alone in the setting of their merciless
scrutiny, runs its course unchecked in his body, and re-
duces the whole machine to a pitiable wreck of itself.
What reality has this terror, or rather the terrifying
image? None. The audience is kindly and attentive.
What is he afraid of? Nothing. It is an unformulable,
nameless fear. Can one even suppose that he is afraid?
That he is feeling a definable emotion? Hardly: the name-
lessness extends even to what he is supposed to be ex-
periencing, for emotions first become distinguishable when
they are expressed in works of art. One might say with
some show of truth that fear, anger, love, hate and the
other passions would never have been distinguished from
one another were it not for the poems and tales and the
fiery eloquence of man, his music, his dances, in which
these emotions are first expressed, and expressly defined
through their own domination and submission to control.
Disintegration *qua* disintegration (i. e. not superseded by
any reintegration) is always the same melancholy thing.
The only real element, namely, in the illusory condition of
the victim of stage-fright is the bodily disarray, the tense,

conflicting muscles and nerves, the pounding and tormented heart. Let this serve as an initial reason for distrusting the romantic artist, the man who thinks he can dispense with resisting patterns and artistic forms, who will not measure his private dreams and imaginings against the common social background of fact and expression, who seriously considers his experiences too ineffable to be put into mere words, mere paint or gesture, and in consequence strains these instruments in an attempt to force them to suggest more than they can ever hold. Everyone has his own definition of the word romantic, which is not therefore to be given up as hopeless. I should explain then, that by romantic art I only mean positively bad art of a certain very common sort—that, namely, which in various degrees considers *meaning* to be the exclusive pursuit of art, and is inclined to a studious neglect of formal order the better to suggest some vague and thrilling infinity. Its theorists, from Hutcheson to Keats, I am afraid, are those who have held that "Beauty is truth, truth beauty."

To sum up the discussion so far, it is in terms of agitation and composure that I would interpret the determinable and its determination in so far as these are taken as the emotional content of a work of art, and the bodily pattern expressing that content. Both are necessary, or rather indispensable, for mere agitation without composure is sterile, and so is a composure which does not compose an agitation; but on the whole, if aesthetic worth varies from work to work, it is in terms of the latter, namely composure, form, or bodily pattern that it varies.

Before going on to this main issue however, the significance of bodily pattern must be examined. An examination namely of the dance may render more precise an account which, as physiological in a general way, may

seem so far to include much that is not art—moral action, for instance, or instinctive reactions, or the drudgery of work.

When I assert that all works of art may be looked at as forms of the dance, I consider this to be true without prejudice to any other such statement, as that all forms of art must be poetical, or approximate to music, or that they are all languages—which I consider to be equally true. That is, the truth of such statements is in their suggestiveness; it is simply a question of the fruitfulness of a point of view.

But the dance is somehow more primitive, or more immediate if you like, than any other art, for the reason that its medium is the body itself. It would be possible to construct a system of the arts as radiating outward from this centre.[1] Thus the arts of mimic and of gesture are obvious offshoots of the dance, first developed within the breeding-ground of tribal ceremony, then practised individually. The arts of representative drawing and formal design again grow out of these naturally, as gestures that leave a trace; a trace which in the first case mimics the forms of objects, and in the second records the bodily pattern or gesture immediately, for its own interest. And so on. All the arts embody, in one medium or another, expertly ordered, rhythmical patterns of muscular contractions; those of the larynx, diaphragm, arms, fingers, etc., and though it is only too easy to lose sight of this origin, nothing in aesthetic theory seems to me to be more important than to keep it constantly in mind.

[1] *Cf.* Alain, Système des Beaux Arts, Nouvelle Revue Française. Alain (E. Chartier in reality) however does not trace the dance beyond that group of arts which he terms public, as opposed to solitary arts. My debt to this most penetrating and admirable study is very great, especially in regard to its treatment of the emotions and the imagination; and this paper was undertaken as an attempt to develop in a more thorough, if I fear, pedantic way, certain of the brilliant suggestions there thrown out in the form of aphorisms.

What we are concerned with at this point is not of course any such systematic construction of the arts as has been outlined, but with differentiating as far as possible between aesthetic and other patterns, between what is specifically the dance on the one hand, and utilitarian, instinctive and moral expertness on the other.

The task seems hopeless at first, since rhythm and expert adjustment of the body are required for any successful action whatever. The differentia seem so far vastly too wide. But let us look closer.

The aesthetic pattern of motions (the dance) may be said to differ from work (e. g. typewriting) as giving release to an emotion, and further as being imposed upon the body for its own sake as a pattern. It has, however, an external resemblance to work since it is a pattern of bodily motions which *is* imposed, while in contrast to both work and the dance, an instinctive or a reflex pattern of motions (e. g. flight, which may exhibit a high degree of expertness) *imposes itself*. Like the instinctive pattern, the aesthetic pattern expresses an emotion, and in this respect it is these two terms which agree, in contrast to work: however, even here there is a fundamental difference, since in the aesthetic expression the emotion as we have seen must have been dominated, disappears in the pattern, instead of being heightened by it, or kept at the alert, as in the instinctive pattern. Finally, we have the moral pattern of action, e. g. where I impose on my vocal organs a deliberate pattern of sound other than that which I desire to make, with the result that I do not speak ill of So-and-so behind his back. Moral value, like aesthetic value, is achieved through the control of instinctive and emotional tendencies; but with this difference, that the moral pattern is imposed after the analogy of work, for an ulterior purpose; my hearer's opinion of me, and his

own sense of confidence seem to me to be the chief causes why in the above case I sacrifice the very real *plaisir de la médisance;* whereas the aesthetic pattern is adopted with a view to satisfaction and release in the pattern itself.

It will be seen from all this that the boundary lines between these various categories are not such as to preclude the possibility of a given pattern belonging to more than one of them at once. Thus, e. g., the gymnastic arts, wrestling, rowing, etc., which on the one hand may be utilitarian or even moral exercises, may at the same time be, are, I should say, forms of the dance. A boat race, as a contest with a definite purpose, falls outside the aesthetic sphere. It demands control of the bodily tumult for an end. Yet it is at the same time an immediately beautiful spectacle, and may be such even to the actors. It demands mastery of the fear both of individual and collective disgrace, and in the proud and rhythmic sweep of the oars that fear, already dominated, is expressed. What force drives these boats up the river? Literally, fear; but fear canalized into a collective pattern of motions is already confidence. The romantic, with his incommunicable dreams, his sacred temperament and his facile improvisations is out of place in this dance.

In a like manner the village dance gives release to the passion of love, or perhaps better to the panic fears of shame. It is a sage remark of M. Chartier that its purpose is to submit the first caresses of the young to the proof of public spectacle, for else only amorous frenzy would overcome this natural timidity. For the same reason, he points out, if a savage dance appear indecent to the foreigner he should not say it is an immoral or abandoned dance, but that it is a very strong dance, to be able to permit so much. However, this is to consider the village dance as a moral occurrence, precisely because it is to take into ac-

count the *purpose* of it. It seems to me that for its beauty it is enough to regard this pattern as the expression of emotions which are humanized and controlled in the pattern itself, quite apart from the *use* which the collective wisdom may make of this control.

Or, take the case of politeness which may fall under several categories at once. It may be a mere policy, or a duty, but it is also a fine art, a dance. As such it is the art of exact expression—not that one can avoid overtones in speech attitude and gesture: there is enough of the primitive cry left in the spoken word that we can never hope to make language an instrument of rigorous precision. But these overtones will be intentional in polite behaviour. Thus politeness does not exclude insults. The officer on leave in mufti was assailed by a bellicose gentlewoman for not being at the front, and replied that it was too risky there. Upon which, indignant, she wanted to know if he did not think honour preferable to life. "Madame," he replied with ex-quisite politeness, "I imagine you are thinking of your own honour and someone else's life."[2] This is polite, because the precise nature of the implied and suggested images is de-liberate; it is all meant. Rudeness, or the poor dance in this kind is any sort of tic, incoherence or lack of coordina-tion which results in expressing less or more than is felt: or it may be the use of a gesture or form of words in the absence of any feeling.

But we are already in the difficult region of the fine arts of speech, and we may go on at once to the main thesis of this paper which is that aesthetic value is always to be estimated in terms of bodily pattern and emotional content, only premising that we are taking the case where it seems most paradoxical to hold this, because aesthetic value is assumed to be of the same fundamental type in *all* the arts;

[2] Alain, "Mars, on la Guerre Jugée," Nouvelle Revue Française, 1921.

namely, an explanation of the value of the dance which will not fit poetry, music, etc., cannot be *the* explanation. There is not, I think, one beauty of the arts of speech, another of the plastic arts, and so on. But as I say, it seems unnecessarily paradoxical to hold that it is the emotional content expressed in a pattern of sounds that gives its value to a poem, rather than the meaning of the poem.

Now the medium of this art is unquestionably complex. Namely a phrase is at least three distinct things, perhaps four. It is certainly always a particular sound pattern: it is always also what seems the antithesis of this, a universal abstract meaning; it is also usually a meaning or sound pattern with a particular emotional colouring. Finally, it is supposed to be or have an associated particular image or selection of images.

Now to say that you can get no more (but also no less) from a good poem than from a good formal design, or from a dance, shocks us, I suppose, because of what is very like a survival of belief in primitive magic in the form of the romantic view that the poet is concerned with an ideal or supernal Beauty which is at the same time Truth; with the result that the value of poetry is supposed to lie in its commerce with universal meanings. Poetry thus becomes an equivalent, a substitute, even a rival to philosophy. Besides being unintelligible, I believe, this view commits us to an uncomfortable dualism of the arts, for there are arts such as formal design, architecture and music whose success, most people would admit, has nothing whatever to do with logical meanings.

However, the above statement about poetry and formal design only seems disparaging to poetry until you try to improvise a thoroughly good formal design yourself, one that could compete with the creations of Greek, Persian, Moorish or Mexican genius. I have already stated some

of my objections to romanticism. Not even the use of vast and vague words will convince me that the romantic is really feeling so much more than he can say—nor for that matter convince me that he knows what he is feeling at all, if indeed he is feeling, and not just imagining that he feels. There is an education of the emotions through art, just as there is of the intellect through science, or of the will through precept and heroic example. We first come to know what we really feel, our emotions and passions first become human, definite, distinguishable through our experience of the accumulated lore of mankind which we call art. For a work of art, whether it be a poem, or one of the Kutahia patterns, is an emotional state, a mood, a passion, occurring first of all in the body of the artist, then projected out of it, detached it may be and left there for others to learn from. The value to our life as a whole of learning in this way what we really feel, (which would be very little without this education) I shall not discuss: it seems obvious enough, and it would not seem that art needs any apology. But I see no essential difference between the wealth of feeling discoverable in a poem, a formal pattern and an architectural or musical pattern. Try to compete: try to improvise on the piano, or with pencil and paper; it is easy enough to copy, but try to improvise, and you will discover the inner blank of the romantic; you will if you are honest experience for yourself the inexpressiveness of mere imagination, that is of unrestrained motion of the bodily machine. If you like, it expresses nothing, because it might equally well express anything; the romantic takes the obvious step and claims that his ineffable revery expresses everything, all at once.

But to return to poetry. Why not, it might be said, temper the severity of this account of the poetic art by introducing here the second pair of correlatives, subject-mat-

ter and treatment. Why not admit the pattern or arrangement of the poet's concepts themselves as an element of form? It is true that such a pattern would, as having images or meanings for its terms, necessarily be repugnant to characterization as a form of the dance; one cannot seriously speak of the dance of concepts, but why should we for that reason reject a view which is so widespread? The most popular form of this device is to talk of a pattern of particular *images,* since it is obvious to nearly everyone that the famous "poetic truth" is not abstract and universal truth. Thus Schopenhauer speaks of the way in which the poet arranges his abstract concepts "so that their spheres intersect each other in such a way that none of them can remain in their abstract universality." Or L. A. Reid points out that when Wordsworth calls Duty "Stern daughter of the voice of God" the moralists' abstract concept of "duty" has disappeared, is completely particularized. One might add that even as an image the daughter of a voice is difficult. And this is of course the point, that even admitting the existence of such individual images, which may with good reason be denied, they are thoroughly inseparable from the logical meaning, so that where there is no meaning there cannot even be a picture. Or, in Schopenhauer's terms, the points of intersection of concepts cannot exist unless the spheres are there to intersect, namely the abstract universal meanings in their full extension. If "Stern daughter of the voice of God" is a pattern of particular images, so is "Let OR be the perpendicular from O and let its length be p." We are all familiar with this sort of talk on the part of litterateurs and literary critics; if they had more philosophy and psychology, they would have discovered that the consensus of modern opinion is on the whole against the very existence of these "mental pictures."

If then under this heading we are only entitled to put "concepts and their arrangement," what are we to say of it? Differences of arrangement can only produce "better" work here in the sense of more correct or clearer statements of logical meanings. I believe this to be an extra-aesthetic criterion, namely that a "better" arrangement of subject-matter, since subject-matter can only be abstract concepts, must mean a grammatically or else a logically better arrangement, and nothing else. We are left then with the remaining two characteristics of language: as particular sound patterns (patterns of laryngeal motion) and as emotionally significant. Namely, "stern daughter of the voice of God" is the undoubtedly fine phrase it is because of its sonority and because of its emotional resonances. We are bound to maintain then that the aesthetic worth of poetry is not a function of its meaning; or as I should prefer to put it, that "poetic truth" simply means "emotional truth," in the sense already explained in which a poem is so to speak an emotional norm, something by reference to which we are able actually to *discover* what we feel. It is customary to inveigh against "merely literary emotions"—and rightly, since this is the essential criticism of the insincere or ugly. But no one calls love a literary emotion, and yet in its contemporary form this emotion simply would not exist were it not for art, perhaps in all its forms, certainly as literature. True love then probably means love true to Petrarch, true to Dante, or better true to the collective norm discoverable in modern poetry.

But it is in the nature of the poetic pattern that we are chiefly interested, in poetry as a dance of the muscles. Observe the instructive parallel of painting—say Cézanne painting turnips on a table. This language is incorrect. For his world of visual patterns is as unnamed as the fresh world of a very small child. He is not reflecting upon

turnips, he is not even feeling about them, not even *painting* them. He is feeling an emotion of awe, wonder, or it may be beatitude, and the visual pattern suggested by the actual turnips on the actual table, but growing independently of them under his brush, expresses and at the same time dominates and humanizes this emotion, brings it to order and gives it an object. Namely, neither the pattern nor the emotion can be formulated as meanings, but the pattern completely formulates the emotion.

Now the poet, and this is what makes his case exceptionally hard, starts with a material which is already a work of art, i.e. language. As an immediate work of art *below* the level of logical meanings, the sentence or spoken phrase is a modulation of the primitive cry in an attempt to express shades of emotional content. For the cry, like any other form of the dance is immediately emotionally contagious, and upon the basis of this primary if vague contagiousness, a whole universe of emotional discriminations is capable of being erected. It is only later, in the sophisticated state where the biological value of communication reverses the original order of things that we can speak of the emotional state as *associated with* or *tingeing* the meaning. In origin, that is in childhood, it is the emotional content which gives birth to the meaning. The poet's position then is a delicate one: it is too late to get rid of the logical or scientific meanings of words, and besides that would not be to write poetry but to try to create a new language, a work of art of a different character; but he has nevertheless, using words in their integrity, to run counter to the biological current, to produce the conviction that language is not a system of universal meanings with overtones of emotional content, but a system of emotional contents with overtones of logical meaning. He has to get back to the primitive cry, to make everything depend upon a sound-pattern, and

yet he is unable to do so since the logical meanings of words are so firmly crystallized. Thus I do not think it is really ushering meaning in again at the back door to say that the emotional content of the word "God" in Wordsworth's phrase is one of the conditions of its sonority.

Normally of course we hear universal conceptual meanings, not phrases at all, just as normally we do not see the coloured pattern of our visual field, but biological meanings as a field of self-identical (i.e. fixed, conceptual,) objects in a traversable space. The transformation of the spoken word in poetry is similar to the transformation of a sheet of your own handwriting if you hold it up against the light, wrong side foremost. Normally, that is on the right side, you never *see* what you have written except where its defects make you doubtful as to your own meaning. But turn it over. There are no longer any defects, since there is no longer any logical meaning. You now see what you have done for the first time, as a pure pattern, and you will be astonished at its curt and incisive stylization, or its harmonious rhythmical flow, or other inimitable graces, I mean features which you literally could not reproduce by deliberate copying. But these excellences are not merely formal. Or, though there is no meaning to the pattern, there is a content. For it does express what you might call the writer's normal emotional composition. It is the dance of his hand and arm. *Le style c'est l'homme* here too, or if one may be guilty of a play of words which gives an exact contemporary rendering of the word "style" in its ancient sense, *"le stylo c'est l'homme."* Some degree of "education of the emotions" would be possble even if the only works of art we possessed were specimens of handwriting.

This example must be pursued even further. For the danger of emphasizing the dance-pattern as has been done here, is to suggest an equation of aesthetic value directly

with that expertness, finish and incursiveness which are an undoubted technical condition of value, that is to express it in terms of our first pair of correlatives, material and shape alone.　My contention is that the mere shape of a line, or a word, (its spatial and temporal characteristics) taken as the shape of a certain material will never get you past that sort of formalism which is undoubtedly sterile. It is only when you put this shape back in the organism as a dance-pattern, when it becomes the shape, if you like, of an emotion that formalism begins to explain anything or to have any practical value for the artist.　Mere skill, which is all that the first type of formalism can give you, lacks the essential correlation with emotion.　The cold flourishes of the copper-plate writing-master are not worth turning over to see what they express, because they express nothing. This man is rude with the rudeness of the man who uses the forms of politeness to cover an absence of feeling; whereas the man who writes illegibly is rude in the sense of neglecting the objective forms of social communication in favour of some unrestrained emotional idiosyncracy.

The poet then has as it were to produce a sheet of his handwriting such that you can see both sides of it at once; or perhaps it is an opaque sheet which permits him to use only one side, the meaning side, onto which he must somehow get the pattern side.　Namely a poem is a pattern of sounds one of whose conditions is that it should have *a* meaning.　But paradoxically the meaning does not enter into the poem as a meaning.　To get back to the primary work of art, or language as directly contagious of emotional content, is the poet's object; and the system of meanings is an auxiliary, in the mathematical sense of a series of elements introduced for the purpose of attaining an object, but eliminated in the result.

The poem must have *some* meaning.　For this reason

Dadaism was a failure. It attempted a poetry of pure sound-patterns devoid of logical meaning, and the result was extremely poverty stricken in emotional content. They did not see that under the impression that they were trying to write poetry they were really trying to create a new language, that they were confusing two quite distinct arts. The only Dadaists of genius are those remote ancestors, those contemporary scavengers, maids, sailors and so on, who create our language.

But the Dadaists were right in feeling that poetry must deal in sound-patterns which directly carry an emotional contagion from one mind to another, and that this takes place somewhere below the level of meanings. For what could be at once more satisfactory as meaning, and emotionally more aseptic than a line such as "Oh, joy, joy, joy"? They were however wrong in attempting to reach this infectious freshness of sound through throttling all meanings. The true poet must use the integral word. His choice is limited by the creations of a first line of artists in another art, he has to acquiesce in their work and his own work starts with such acquiescence. His task is to utilize integral words and phrases in such a way that their universal meaning eliminates itself, just as, in the final result, Cézanne eliminates the turnips and leaves you face to face with a human emotion expressed in a pattern for which there is no verbal or conceptual, but only a bodily transcription. In ordinary life the sound-patterns "daughter" and "God" have become their own names, that is the sound-pattern is no longer heard, it is swallowed up in the meaning. But the sound-pattern "stern daughter of the voice of God" has no name; that is, the meaning of the words is reabsorbed into the pattern. As poetry it exists below the level of words (= meanings) in the same way as the patterns traced by the body of a dancer.

To resume these points then, a poem must have meaning, because meaning helps to specify emotional content; but meaning must also be got rid of, its only function is its reference backward to the primitive work of art, the language or systematized cry, in which meaning is still only latent. Meaning cannot enter the poem as such simply because meaning is always inevitably connected with demonstration and proof, is *relative* to these, and the work of art must produce conviction without proof, by direct contagion; must in fact be incapable of proof. It is then not in terms of meaning that the value of a poem varies; but, like any other work of art whatsoever, directly in terms of formal pattern, and indirectly in terms of emotional content.

In conclusion, it will be asked how can you justify the critical estimate of a work of art on the basis of its formal (bodily) pattern; what makes a good form good, and a better one better than a good one? The answer is the respectable if disappointing one that aesthetics is not a deductive science. There is a theory of aesthetics, namely of what in general are the contributory factors of aesthetic value and how they are distributed. There is also an empirical classification of works of art as to their relative merit, which is capable of reaching a very high degree of certainty. For instance it is as certain to me (if not as clear) that Bach's Matthew Passion is better than Rossini's William Tell, as that ten is greater than five.

But as a pattern whose content must be *felt,* rather than cognized, there is, as has been just said, no demonstrating a work of art. If it were possible to *prove* that one form is better than another and to explain *why,* it would be theoretically possible to lay down the rules for making good pictures and dramas with as much precision as the rules for building a sound bridge. A science of aesthetics in this

sense is as impossible as a science of ethics which would tell you just what to do in every contingency of life. Even to name a dance-pattern is to denature it, to remove it from the sphere of felt values to that of practical meanings. It becomes at once a commercial recipe like the egg-and-dart pattern, an archaeological item like the Greek key and swastika, a scholastic instrument like the anapaest and dactyl, etc. Aesthetically each of these is merely the notation for a dance which you yourself must perform before you can know what it is about, a dance which cannot be judged from the outside, but can on the contrary be judged excellently from within, when it is lived through.

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AESTHETIC EXPERIENCE IN PICTORIAL ART

IN looking at pictures, two different, important reactions
are possible. Most experiences are mixtures of both, but
one or the other usually predominates. The first I shall
provisionally describe, without intending to define, as a
reaction to visual sense-objects as such. Thus, for example,
I might say "What effective contrasts are gained in this
picture by the spacing of the lights and shadows" or "That
octagonal figure looks very well on that rectangular base."
The second kind of experience is a reaction to visual sense-
objects, not as such, but as having meaning. Meaning may
be conveyed either by representation or by symbolisation.
Thus, for example, I look at a picture and say, "What I
like about that is the expression on the man's face," or
"What a beautiful representation of Love Triumphant!"
If I habitually react in this way I may sometimes assume
a very puzzled expression and exclaim "Now, what on earth
does that mean?"

The first kind of reaction—the reaction to visual-ob-
jects as such—undoubtedly exists. Indeed every work of
visual art can arouse it, whereas this is not true of reaction
to meaning, for some works of art are neither representative
nor symbolical, and these include not merely modern pic-
tures but also Chinese vases and Persian rugs. I shall call
the reaction to visual objects as such, the "aesthetic ex-
perience," thereby using the term not in the wider sense in

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which it is used for almost any mental reaction which a work of art may cause, but in the narrower sense in which it is used for one specific kind of reaction.

In this article I shall first discuss the possibility of co-operation between the experience of meaning and aesthetic experience. By "co-operation" I shall mean the union of both experiences in such a way that each either augments or at least does not detract from the value of the other. Secondly, I shall examine the constituents of aesthetic experience. I shall assume throughout that visual objects —as we may call the objective elements of aesthetic experience—can be graded in value. Some pictures are better than others because the coloured shapes of which they are composed are either more valuable in themselves or capable of arousing a more valuable reaction in a spectator. What we mean by calling them more valuable and to what characteristics their greater value is due are points which will not be considered. The latter, I would say in passing, is probably the most important question for the aesthetics of pictorial art, though there is perhaps none about which less is known.

<center>I</center>

In discussing the possibility of co-operation, one may distinguish between concrete and abstract meaning. A picture may represent, and be known to represent, a number of statesmen at the signing of a Treaty, or a young man judging which of three women is the most beautiful. In both these cases the meaning is concrete. It is still more concrete if it be known that the treaty is the Treaty of Versailles and the minister on the right Mr. Lloyd George, or that the young man is Paris and the three women the goddesses Aphrodite, Athene and Hera. We are aware of concrete meaning when we are aware of a picture as

representing, for example, an anecdote, a historical event or a symbolical situation. A picture, however, may simply represent a man sitting in a chair; or I may be aware of a picture as representing men and a landscape, without being aware that it represents the dedication of the sons of Zebediah. These are examples of abstract meaning.[1]

The distinction between concrete and abstract meaning is relevant because the more abstract the meaning the less weighty are the objections to co-operation. The objections actually brought against co-operation are usually based on the consideration of concrete meaning alone—as in Mr. Roger Fry's illuminating discussion.[2]

In any case co-operation can be achieved only when the reaction to meaning and the reaction to visual objects harmonize in their nature and value. Thus there can be no co-operation if the visual object suggests calm and serenity and the meaning is one of violence and force. Nor can there be co-operation if the visual object possesses a very high value while the meaning is crude. Such discord between the visual factor and the meaning is often found. One may be lost in pleasant aesthetic contemplation of a picture and then suddenly realise that it has some disturbing allegorical significance. The shock is about as great as if someone were to point out a fly crawling along the frame. Often the nature of the visual object is quite discrepant with that of the allegory or anecdote, and there is an infinite distance between their values. In such cases it is fortunate that one can ignore the meaning.

We may consider four objections to co-operation. (i) The first arises from the fact that the representative ca-

[1] It should be noted that in contemplating a picture which is capable of conveying a very concrete meaning, we may be aware only of a vague or abstract meaning. It is only apprehended meaning that I am considering here.

[2] See his essay on "Some Questions in Esthetics" in his *Transformations*. (London, Chatto and Windus, 1926.)

pacity of pictures is limited, not in faithfulness or "truth to nature," but in refinement. The value of a verbal narrative is not due entirely to its precision; it also depends on all sorts of other qualities like profundity, terseness and elegance. Can pictorial art claim this type of excellence? Only very rarely, if at all, in representations of narrative. These may excite great interest, they may excite strong emotions. But our experience is more like that called forth by Miss Marie Corelli than that aroused by Tolstoy. One reason for this may be found in the fact that the control exercised by pictorial representation is far weaker than verbal control. The spectator is simply led to indulge his own fancy, which is more likely to be lively than profound; and the crudity of the experience prevents its co-operation with that of a valuable visual object. This applies to any pictorial representation of events. But a representation can be fairly concrete and yet not crude—as, for example, in character study and caricature. Here the experience of meaning can be both concrete and valuable; but, even so, if the arguments which follow are sound, it is unlikely to co-operate with an aesthetic experience.

(ii) Emotions also can be described as concrete or abstract, according as they are attached to a specific situation or are relatively vague and unattached. The latter are emotional moods rather than emotions, and it is only they that are concordant with aesthetic experience. Every concrete emotion is discordant—whether it be the spiritual experience of a believer before a representation of the Annunciation or the morbid curiosity of a sensation-hunter before a represented execution. Since the experience of concrete meanings tends to excite concrete emotions, this is another reason against its co-operation with aesthetic experience.

(iii) There may easily be a discrepancy between the needs of meaning and those of aesthetic experience. Thus, for example, the representation of what is psychologically correct may conflict with the aesthetic demands of the visual object. It may be thought that this fact merely sets a problem which the great artist solves. But, though the problem can be solved, it is unnecessary that it always should be. Aesthetic experience is quite important enough in itself to warrant a disregard of extraneous demands.

(iv) Finally, the amount of attention needed for the adequate appreciation of a valuable visual object is greater than is usually recognized. There is a tendency to treat pictures, in their visual aspect, as if they were merely decorative illustrations, and to consider that the differences between them lie chiefly in their meaning. But while an illustration, as a visual object, can be grasped very quickly, the visual elements in a great picture demand an analytic attention as exacting in its way as that which is necessary to solve an intricate problem. Hence attention to a complicated meaning is simply a diverting influence.

It is easy to see that these four objections do not apply to abstract meaning. (i) An abstract representation lacks intrinsic value; but it also lacks crudity. While the absence of the latter is an advantage, the absence of the former need not be a disadvantage. The more abstract the meaning the less positive value it need possess in order to co-operate with a valuable aesthetic experience. It simply reinforces and supplements the experience derived from the visual object. (ii) An abstract meaning naturally excites vague emotions. (iii) The more abstract the meaning, the less are its claims as a representation; hence they are less difficult to reconcile with those of the visual object. (iv) Finally, an abstract representation clearly demands little effort of attention.

My conclusion, then, is that there is no obstacle to co-operation between an experience of abstract meaning and an aesthetic experience. Moreover, almost invariably, it is only in so far as an experience of meaning produces emotional moods, as distinct from emotions, that it can co-operate with aesthetic experience. Suppose we are looking at Donatello's "Youthful John the Baptist," in the Kaiser-Friedrich Museum, which expresses prophetic zeal and energy. If we are to have an experience of meaning which will co-operate with an aesthetic experience, we must not relate the zeal and energy to incidents in John the Baptist's history, nor even definitely to John the Baptist himself; we must simply experience them as we might experience the serenity of a peaceful evening by a deserted sea.

II

I turn now to my second object—a description of aesthetic experience. Mr. Roger Fry describes it as "a reaction to a relation, and not to sensations or objects or persons or events."[3] Following his lead, I shall describe it as the perception of volumes and colours as related to each other, together with the resulting reaction.[4] The reaction of course partly consists of satisfaction or dissatisfaction, these terms being used to cover so wide a range of conscious states that satisfaction, for example, will comprise both mild approval and ecstatic joy. But the perception of related volumes and colours can also excite other emotional and sensory experiences without the mediation of the cognition of meaning. Past experience may play an essential part, but present cognition of meaning does not. I take some at least of the emotional and sensory experiences so

[3] *Op. cit.*, p. 3.

[4] I believe, however, that it is also a reaction to "sensations," for it is a reaction to a complex composed of terms as well as relations.

aroused to be constituents of aesthetic experience. These may be briefly described.

(i) *Emotional Moods.* We may feel mournful because we are looking at a representation of a death, but also simply because we are looking at colours which are dark. Emotions aroused without the mediation of meaning are of the vague, unattached kind already referred to as emotional moods. They are like the emotional experiences aroused by an abstract meaning—like the experience of zeal and energy excited by the bust previously considered. The meaning and the visual object excite experiences of the same type. Thus, when Mr. Roger Fry describes a picture of a landscape[5] as having "lyrical, contemplative charm,"[6] he is indicating an experience of this kind. "Lyrical, contemplative charm" clearly signifies an emotional mood, and the experience of abstract meaning— the cognition of the landscape—co-operates with the visual object to produce it. Emotional moods play an important part in Mr. Roger Fry's aesthetic criticism. Thus, for example, "grave impressiveness," "richness" and "rollicking self-confidence"[7] are emotional moods said to be produced by certain pictures. Comparing Fra Bartolomeo's two pictures of "The Marriage of Saint Catherine," he points out that "by a different choice of proportions, by a different 'tempo' in the rhythm and by a difference in the number and size of the main volumes as revealed by the incidence of the light, a completely different mood is imposed on the spectator." And he contrasts "the severity of the Louvre picture" with "the mood of almost jubilant delight" evoked by the picture in the Pitti.[8]

[5] Fra Bartolomeo's "Adam and Eve" in the Johnson Collection, Philadelphia.

[6] *Op. cit.,* p. 90.

[7] *Op. cit.,* pp. 91, 92, 75.

[8] *Op. cit.,* p. 88.

(ii) *Cutaneous Experiences.* These, too, may form part of our reaction to the visual object. Thus, for example, Mr. Roger Fry refers to "hot, greenish blues"[9] and "the warm luminosity of sky and distance."[10]

(iii) *Kinaesthetic Experiences.* Here, as above, I purposely use no more determinate term than "experience," because it is so difficult to find the correct one. Are these experiences sensations, images or neither? Certainly they are intimately related, in the one case to cutaneous, in the other to kinaesthetic, sensations. Moreover, the term "kinaesthetic" is here used in a wide sense to cover experiences of rest and tension as well as of movement. These experiences are very important, and we can get evidence of their importance from two sources. (*a*) First, there are the terms used in aesthetic criticism. Thus "balance" is one of the most important critical terms from the aesthetic point of view, and it clearly has kinaesthetic reference. Again one talks of "flowing lines," of "solid masses," and so on. It is indeed surprising to find how few of the terms applied to lines and volumes have no kinaesthetic reference. Mr. Roger Fry's criticisms will again afford good examples. He is one of the few critics who analyse the visual object, as distinct from its meaning, and therefore the frequency of kinaesthetic terms in his criticisms is clearly very significant. He uses "flowing" and "solid" again and again, as, for example, when he says that "the linear rhythm of Chinese Art is peculiarly continuous and flowing,"[11] and that "almost imperceptible changes of colour build up for us solid volumes."[12] Among his other kinaesthetic descriptions are "weight and density

9 *Op. cit.,* p. 93.
10 *Op. cit.,* p. 92.
11 *Op. cit.,* p. 73.
12 *Op. cit.,* p. 194.

of colour," "heavy crimsons," "a rigidly straight line,"
"tight, mechanical elegance,"[13] and "firmness and weight
of the base." (*b*) Secondly, if we introspect, we can see
that it is through their kinaesthetic character that lines
and volumes affect us. Some pictures obviously excite a
feeling of movement. Others obviously excite a static
feeling. And even when the kinaesthetic appeal is not
obvious, it is not difficult to find. Thus the critical terms
are not mere metaphors, but are based on actual kin-
aesthetic experiences.

Emotional moods and kinaesthetic experiences usually
form part of our reaction to the visual object, and are
therefore usually constituents of aesthetic experience. But
they do not merely co-operate as parts of the same whole
with satisfaction or dissatisfaction. When, for example,
kinaesthetic experiences occur in aesthetic experience, the
satisfaction or dissatisfaction which we feel is actually de-
pendent on them. If the kinaesthetic experiences were not
there, the visual object would not give the hedonic tone
which it does give. It is because we perceive lines as
"flowing," volumes as "solid," and so on, that we are
pleased. Indeed, when we consider the frequency and im-
portance of kinaesthetic descriptions of the visual object,
it becomes plausible to believe that most of our aesthetic
experiences are dependent on them, even that we have none
which is not. I would even go a step further and say that
aesthetic approval is dependent on kinaesthetic satisfac-
tion. But, though kinaesthetic satisfaction may be a neces-
sary condition of our aesthetic approval, it is not a suffi-
cient condition. It produces aesthetic approval only when
it is aroused by the perception of lines and volumes as
related.

[13] *Op. cit.*, pp. 93, 74, 71.

Emotional moods can thus be excited both by abstract meaning and by the visual object. In the former case, they may co-operate with aesthetic experience; in the latter case, they are constituents of it. Further, when emotional moods or kinaesthetic experiences occur as results of perceiving the visual object, they are not merely constituents of aesthetic experience, but our satisfaction or dissatisfaction is dependent on them.

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SCIENCE AND TRAGEDY

TRAGEDIES arise out of disruptive contradictions inherent in morals. It is such unavoidable contradictions and not the intrigues of a villain that bring the play to its tragic conclusions. To the Greeks all the characters in for instance the Antigone of Sophocles, seemed deserving of sympathy, for all are fatally true to some Greek ideal of integrity and virtue. And if evil and villainy rest anywhere it is not in man but in the world that has made such conflict of the good inevitable. Tragedy is the vain struggle of human good against a cosmic evil.

Obviously, these human ideals and emotions must be invested with a dignity and nobility commensurate with so vast an antagonist, else the conflict becomes mean and ridiculous. In the tragedies of Aeschylus and Sophocles this dignity finds an outward expression in the divinity and majesty of their characters. To depart from this external rank and splendor marks for some critics a departure from tragedy. So Nietzsche mourned the death of tragedy in the plebeian hands of Euripides. But this essential dignity rested on no traffic with the gods. It was no luster reflected by the grandeur and supernal powers of kings and divinities, but well founded in Greek concepts of human excellence. For these tragedies celebrated not pomp and circumstance but Greek virtue.

Some critics recall with regret that in that golden age

nature and the gods took a neighborly interest in man. Man
held himself in importance and esteem, and so tragedies
were not merely read but written. Even Shakespeare could
feel this ancient sense of human dignity. But today man
is seen to be what he really is: a petty, unimportant animal
with a mean past and no future. Instead of love he has a
libido; instead of will, conditioned reflexes. The gods have
forsaken him and left him desolate in the mathematico-
mechanical universe of physics.

For these critics science has somehow destroyed human
values. Our ideals are not found in the quantitative real-
ities of science, so with more courage than insight they are
renounced as illusions. The tragic faith is dead. Poetry
can no longer sing the grandeur of human conflicts, for
science having destroyed that grandeur, the song has be-
come empty gesture and bombast.

But a more competent interpretation of the methods
and facts of science will show no such opposition to the
tragic spirit. Science does indeed depict a world from
which values of good and beauty are absent. Uniform
elements in motion within an abstract mathematical struc-
ture are not the themes of ethics or of art. But neither are
they the only realities.

Scientific theories are not inspired revelations any more
than scientists are mystics. The concepts of science are
intellectual devices for the solution of problems of a definite
kind. They are not exhaustive statements or descriptions
of reality. In using these concepts science restricts the
extent of their applicability. For the categories of science
would be as inapplicable to art as those of art are to science.
Whether scientific objects, such as electrons, electric fields,
and sensations are real or not is an ambiguous metaphysical
question with which the scientist is not concerned. He is
satisfied to find them adequate as tools of explanation, dis-

covery and invention. Other human enterprises may require different concepts which may have an equal claim to reality.

That esthetic or moral values find no place in the physical universe does not discredit those values but rather impugnes the adequacy of science. For while there is a compelling logic in scientific thought that hides its partiality, still the field of experience is obviously larger than the domain of science, and just as real.

To express and interpret that experience is the function of art and science. Both find their fulfillment and justification in enlarging human vistas and refining human sensibilities. Art as well as science expresses genuine realities, but by different abstractions and more concrete metaphors. Art presupposes the world of science and in the uniform and monotonous structure that science develops, art echoes a human accent and emphasis.

In a sense the entire human drama, like its natural scene, is the aimless shifting of matter. The difference between so describing it in terms of science and in those of morals or esthetics is, however, merely a difference of context. Considered in one aspect material forces disclose a mechanism, the ways and operation of nature. In another context they are characterized by their direction and efficacy. By stressing the first, we reveal the structure and habits of nature. By examining the second, we discover the values in things. Values are born of the natural forces whose functions and utility they express.

It is this legitimate parentage that assures human values their claim to reality. Moral values are inevitable selections which a conscious active organism makes between those things which minister to desires and those which hinder them. These selections are felt existences and empirical facts. They are not illusions with which man col-

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ors an inhuman and indifferent reality. And it is with these real values that tragedy and moral philosophy deal.

A philosophy that denies these values their reality curiously ignores our most vivid and common experience. But it is just as groundless to say that science has shown them to be somehow unimportant and by so demeaning them has made the tragic attitude irreconcilable with modern intellectual temper. For an honest inventory of the forces of nature would not neglect those confused impulses and emotions which are expressed in moral values. And while a just appraisal would declare them trivial on nature's account, they must be allowed their true estimate in human economy. No philosophy can ignore the strength of these living forces in man. They are the springs of his action and the principles of choice.

Not only has science failed to destroy the tragic spirit, it has revealed its essential nature. For it has shown that human life can reach tragic intensity not because here and there life is informed by the majesty of rank and power but because life in all stations is enacted amid hopeless conflicts. Tragedy need not wear the royal purple. It appears wherever emotional anguish is tempered and transcended by intellectual understanding.

It is in the dual act of condemnation of nature and resignation to it that tragedy is born. To love the impossible and renounce it, to hate the necessary and yield to it, to free the intellect of the restless urge of will and so liberate it, to view evil as a thing no longer to be feared but understood, that is tragedy. It is not a dumb, desperate yielding, nor a self-pitying, regretful renunciation, but a joyous act of self-assertion and understanding. It is in human intelligence rising above animal instinct that man transcends the suffering of his frustrated will and achieves that supreme detachment that renders his experience sublime.

Such sublime resolution of the conflict is possible only in contemplation and the tragic form requires this attitude on the part of author and reader. The Greek culture, essentially one of such contemplative understanding, was particularly fertile in tragic literature. Struck by the conflict between human ideals and natural limitations, these tragedies subdued its bitterness without hiding its poignancy, and by rising above the conflict in defeat they revealed a fine sturdiness and a profound dignity in man.

It is a curious yet common interpretation of this tragic attitude that it rests on the faith that somehow the universe is aware of man and is concerned in his affairs. But while this faith was alive in the Greeks and perhaps in Shakespeare, it was incidental to tragedy. The tragic attitude demands only that the confluence of fatal events be inevitable, else the calamity gives rise not to tragedy but to a pitiful accident that greater knowledge and finer skill could easily have avoided. To Sophocles the Gods were efficacious forces in nature. Modern science has destroyed the gods but not the ineluctability of the natural order. And the modern belief that the universe is no longer concerned with man does not relieve the sting of a morally intractable nature.

It was not in their naive science but in their stern morality that the Greeks revealed the tragic spirit. And it is in the simple stately outlines of that morality that the tragic character appears. In the tragedies of Aeschylus and Sophocles the characters are simple embodiments of the moral concepts they struggle for. So abstracted and typified they assume the inflexible grandeur of the ideas that moved them. What they lost in individuality they gained in moral force and dignity.

Greek tragedy is a fundamental, unanswerable criticism of morals. All protagonists are in some sense good, yet

together irreconcilable. The spectacle of such devastating conflicts would have reduced a less philosophical people to utter nihilism and despair. A more reflective spirit finds in it a splendid expression of nobility. For man's dignity is here superbly expressed in his ability and willingness to choose suffering rather than enjoyment in humiliation, choosing rather to terminate life than deny his own ideals and natural interests.

Not the pervasive pomp of kings, nor the miraculous powers of gods, but an earnest morality furnish the foundation of tragedy. So tragic literature flourishes best in a culture where moral ideas are clearly conceived, and where preoccupation with them is the chief intellectual activity. Modern science has not rendered tragedy impossible, for the art of tragedy could be lost only in an age of complete moral scepticism. So long as man discovers moral values in a world which hinders their enjoyment, the tragic spirit will live. We are not only aware of these values but their criticism is our basic intellectual concern. For there is a ceaseless urgency with which the problems of ethics press upon us and which makes moral philosophy live even where other enterprises of reason pale to irrelevance. As the human scene shifts, as new affinities are discovered and new physical conflicts arise, morals are seen to harbor inner contradictions and inevitable calamities, and so the tragic situation is revealed. To view the consequent anguish in the aspect of necessity, without regret or pity, is the expression of the tragic spirit. For this not thunder and sceptres but a dispassionate intellect is needed, since it is only through the freedom of the mind from all desire and fear that ultimate resolution of fatal conflicts is possible.

There are two prominent characteristics in Greek and Elizabethan tragedies which are not found in modern

tragic art: the simple heroic outlines of the protagonists and their articulate eloquence. So long as the tragic artist is interested only in the clash and discord of great ideals these will remain adequate devices of expression. But no sooner does his interest extend to character than his protagonists lose their austere simplicity. The function and powers of the character become less explicit and the play can no longer unfold his heroic mission with that early single-minded intensity.

The heroes of legends and early tragedies are sharp abstractions. They express social and moral truths which are the major intellectual interests in a naive culture. Interest in individual character marks a tendency toward realism and appears only on more sophisticated levels of civilization. Aeschylus and Sophocles were traditional, and uncritically reflected the splendid naivete of the Greek legends. Euripides, who was somewhat of a critic and a philosopher, no longer remains satisfied with their simple traditional abstractions and reveals an interest in the personal and individual. This interest in character delineation no more destroyed the tragic force of Euripides than of Shakespeare, but it sowed the germs of a transformation of tragic art which has reached its consummation in our day: namely, the change from the sharply defined abstract characters of early Greek tragedy to the complex, individual persons that people our own stage.

In the tragedies of Shakespeare and the Greeks, characters meet the most poignant situations with a fitting and fluent eloquence. Here the importance and stateliness of the situation is made explicit. The action is for the moment arrested and contemplated, and the protagonist becomes the interpreter of his own experience. Macbeth on hearing of his wife's death takes an unnatural but expressive pause to reflect on the vanity and insignificance of life. Actually

the anguish felt in the situation would stay the thought and words even if the character were able to conceive them. But though in action they are false, these lines are true in meaning. It is as he might have spoken could his language grasp the full richness of his experience.

Modern tragic writers are preoccupied less with explicit statement of meanings in drama than with the faithful rendering of human behavior. So their characters are endowed with no such improbable articulateness. The situations they create are still tragic since they reveal the conflict and fatal conquest of values, but their rendering is truer in action. That ultimate reconciliation that Macbeth expresses is in modern works left to be effected in the spectator's mind.

Both this heroism of the characters and their poetic eloquence were conspicuously present in classic and Elizabethan tragedies. In these early plays life is tragic only in its ceremonious aspects and holiday moods. Princely heroes defy the thunders of the gods, and stately ghosts bring memories of lost kingdoms and faithless queens. Such royal colors and decorous temper well become the tragic spirit.

But there is also a decorum proper to life's workaday scenes, where tragedy is as poignantly present. It is such tragedy without flourish or gesture that appears on the modern stage. Life is still intense and full of vast contradictions even when seen in humbler quarters. For the tragic spirit is at home in Casterbridge as well as in Thebes, and though Hardy's mayor passes unnoticed by gods and nations he is as strong in his struggles and as great in defeat as those classic heroes whose careers arched the heavens and the earth.

The heroes of that ancient pattern are inessential features of tragedy. They are expressions of dominant social

interests. The hero lives in ancient literature not as an individual but as a race- or culture-symbol. Hence the survival of the hero in religion and in present day primitive societies. The concept recurs in modern western thought whenever morality acquires dominant racial motives as in the case of Nietzsche.

The hero is a dramatic archaism not because the modern temper has found the vision of that human grandeur baseless, but because interest has shifted from the social to the individual. In this new setting all that was superfluous in ancient tragedy is eliminated, but the fatal contradictions between will and possibility remain. These conflicts are not demeaned by restricting their scope to the individual's life and character. The ancient disharmonies between human ideals and natural limitations reappear in a "Master Builder." And these undeserved fatalities are so much more painful since no angry god or consciousness of sin can be invoked to explain them.

Sinless and godless, we see no divine justice in our failures, only the stern, irrational discrepancy between ability and desire. Having failed we can redeem ourselves only in the thought that we have dared, and that in this vain conflict we have found ourselves, that in suffering we have seen what it is to be human. It is this vision of courage and fortitude and self-assertion that yields the intellectual joys of tragedy. Life is here vindicated by art not because it is good but because it is hard and beautiful. So we can exclaim with Nietzsche: *"War das das Leben? Wohlan! Noch einmal!"*

Our modern scientific world-view enhances the fine audacity of this challenge. While science has not made man less important, it has certainly made him more lonely than in those days when he turned with fear and hope to Olympus. The gods were never so inexorably mute and deter-

minate as nature is conceived to be today. No hope is left to the modern man who has encouraged in himself desires destined to failure. For he knows that neither prayer nor sacrifice nor divine pity can stay his defeat.

So,—far from opposing the tragic spirit,—science deepens its poignant beauty. Relieved of the incidental trappings of court and altar, its sublime discords reveal a more human accent than ever. It was in an age of science that Spinoza showed tragedy to be not merely a form of art but a way of life as well. To view all things *sub specie aeternitatis* is but the courageous pessimism of tragedy. And the tragic catharsis never found more sublime expression than when that humble student of science revealed life's contemplative beauty through his *amor Dei intellectualis*.

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THE NATURE OF RIGOROUS DEMONSTRATION

FOR the past three hundred years mathematics has been developed by geniuses who were anxious to make new discoveries, to demonstrate new propositions; it has only been very recently that logicians and mathematicians have seriously turned upon their science and sought to discover the foundations upon which it is built. They have talked about rigorous demonstration, and have brought forward supposed examples of it, only later to discover that these supposed rigorous demonstrations, while correct enough, nevertheless omitted essential steps or failed to state essential presuppositions of the proof. In the effort to advance the boundaries of mathematical knowledge, the nature of rigorous demonstration has been left vague and unsettled, to the great confusion of the science. Mathematicians have endeavored to state what are *all* the postulates of given mathematical systems, but as yet no general method of discovering such postulates has been discovered. If we could find out what are the requirements of completely rigorous deductive proof, we should have such a method. It is the purpose of this paper to endeavor to state what is necessary for a completely rigorous deductive demonstration.

Let us provisionally define a rigorous demonstration as one in which are stated clearly all of the presuppositions of the proposition to be demonstrated, and in which these

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presuppositions are combined in a perspicuous manner to produce the required result. Then let us see to what concrete formulation such a criterion will lead us. Certainly there could be no stricter requirement of rigorous reasoning than the one we have given, and we are seeking for the characteristics of the most rigorous and exact deductive proof.

In the modern world, mathematicians have not dealt explicitly with this problem; but in the ancient world Aristotle wrestled with it. He was troubled by the disputations of his contemporaries, and endeavored to discover a scientific method of reasoning which would determine just what inferences could be correctly drawn from given premises. He thus discovered the syllogism—the first attempt to state the requirements of rigorous proof. But Aristotle, while a competent mathematician, was not interested in the philosophy of mathematics; his logic was formulated as the result of an attempt to give to the dialectical and rhetorical disputations of his day a scientific methodology— it had nothing to do with mathematics. Its purpose was ultimately practical, the settling of disputes, rather than theoretical, the statement of the general conditions of proof. Thus formal logic and mathematics were separate in their origin. They have since pursued opposite courses. In the modern period Descartes, whose influence upon mathematics was as profound as upon philosophy, accentuated that separation; he despised the Aristotelian logic of the schools as being entirely useless, and tried to originate an intuitive logic modelled after his own procedure in his mathematical discoveries. Thus mathematics and logic have been separated, and the mathematician and logician would have little of each other. Yet both pursue the deductive method, and those mathematicians who have attempted to state the fundamental postulates of any branch of mathe-

matics have been obliged to confess that these postulates are combined in accordance with the laws of formal logic. In such a situation, is it any wonder that the nature of that logical rigor upon which mathematics prides itself should have remained entirely vague? Let us try to enter into the Aristotelian logic in the spirit of the mathematician, and then apply what we find there to mathematical reasoning. By this method we may come to an appreciation of the nature of this mysterious ideal of rigorous demonstration.

I

First we must test the rigor of the Aristotelian syllogism. Suppose we ask ourselves the question, How many propositions are implied in the drawing of a syllogistic conclusion? In Aristotelian inference, we have been accustomed to say that in a syllogism two propositions are necessary as premises, and that in immediate inference only one is needed; but that if more than two are needed, the argument can be put into the form of a set of syllogisms or immediate inferences. In addition we have talked about the *Dictum de omni et nullo,* or of the *Nota notae.* But what relation have these propositions to the premises of the syllogism? Certainly they are not premises, yet they seem to be involved in the syllogism. Similarly in mathematical inference we have reasoned that if 'x=y' and 'y=z,' therefore 'x=z,' but we have also the statement that 'Things equal to the same thing are equal to each other,' which does seem to be involved in the reasoning, yet is plainly not one of the premises.

A convenient and easy means of discovering the presuppositions of any argument is to ask ourselves the question, What propositions can be found, which are both deductively independent of all other propositions which we have already found to be presupposed by the piece of inference we are analyzing, and the separate denial of which

renders the conclusion false or invalid?   For if the denial
of any proposition changes the truth-quality of the conclu-
sion, it is plainly presupposed by the conclusion, either
mediately, through some other proposition, or directly.   It
then we eliminate all propositions from which we can de-
duce those which we have already found to be the direct
presuppositions of the conclusion, we shall have left the few
which are directly involved in our argument.

By applying this criterion to an ordinary Aristotelian
syllogism, as for example, "All ruminants part the hoof,"
"All deer are ruminants," therefore "All deer part the
hoof," we find that both premises are necessary to draw
the conclusion, for if either is denied (or any proposition
from which either could be deduced), the conclusion would
not be necessarily true.   Similarly, there is a third propo-
sition or *canon* of combination of the premises, which, if
denied, would independently prevent us from asserting the
truth-value of the conclusion, namely, the rule for the com-
bining of the premises of a syllogism in *Barbara*.   For if
we make the experiment of denying the rule for combining
the premises in *Barbara,* that is, if we deny that *Barbara*
gives a valid syllogism, the conclusion does not follow.
Yet the rule for drawing the conclusion of a syllogism in
Barbara (or any more general rule of which it is a par-
ticular case and which would be denied in denying it) is
the only rule of combination which would apply to this
syllogism, for evidently this syllogism presents the charac-
teristics of a syllogism in *Barbara* and of no other.   Any
other statement which we attempted to put into the place
of the rule for the syllogism in *Barbara* would be equiva-
lent to our canon, and would be denied in denying it; if
we used any other non-equivalent canon, the premises would
not fit such a canon.   Were we to change the form of one
of the premises and use the rule of the hypothetical syllo-

gism, or any other form of the syllogism, we should no longer have this syllogism, but another, because we should have a different set of premises, though they might mean the same. Thus the canon of combination of premises is one of the presuppositions of the conclusion of a syllogism.

Just how the canon of the Aristotelian categorical syllogism should be stated has been discussed by logicians, but its function has not been understood, and consequently no definite agreement has been reached. The *dictum de omni et nullo, Quod de aliquo praedicatur, praedicatur etiam de qualibet eius parte,*[1] is the medieval formulation of Aristotle's statement of the canon of syllogistic reasoning. Since Aristotle regarded all forms of syllogisms as reducible to the first figure, he stated the canon in a form applicable to that figure only: 'What is predicated (stated or denied) about any whole is predicated (stated or denied) about any part of the whole." As this canon seems to necessitate that the syllogism be understood in extension, the *Nota notae* was formulated for the syllogism when understood in intension, *Nota notae est nota rei ipsius,* and *Repugnans notae repugnat rei ipsi.* Mr. Joseph has derived a formulation from Kant's statement that the syllogism subsumes a cognition under the condition of a rule, "Whatever satisfies the condition of a rule falls under the rule"[2]; but this formulation may be objected to: it is usable only for syllogisms with an affirmative minor premise, and the terms, "condition" (which seems to refer to the middle term) and "rule" (which seems to refer to the major premise) are unnecessarily abstract and used in a confusing manner. The relations between the terms of a syllogism which is understood in extension are different from the relations of a similar syllogism when it is understood in intension. This difference is apparent when the syllogism is stated in exact

[1] See Joseph, *Introduction to Logic,* p. 296, note.
[2] *Ibid.,* p. 309.

symbolic terms.   That fact shows us that the Aristotelian
syllogism is essentially ambiguous, and that the same for-
mula can be used for different types of reasoning—this
characteristic of the Aristotelian syllogism is probably the
reason that it has been so difficult to formulate its canon.
Furthermore, when the major premise of an Aristotelian
syllogism is a definition or a universal affirmative proposi-
tion which is convertible *per simplicem,* we have still another
variety of syllogism, for it can now be used to draw con-
clusions which are otherwise impossible; it now needs a
different canon from that used ordinarily.   Either we must
give the categorical syllogism a set of canons for the dif-
ferent types of reasoning expressed in it, or we can state
the canon in the clear but cumbersome and ambiguous form,
"In an Aristotelian categorical syllogism, when the eight
syllogistic rules are all observed, the major term may be
predicated (asserted or denied, as the rules require) of
the minor term."

Our list of presupposed propositions does not stop with
the premises and canon, for, by applying our criterion for
finding the presuppositions of an argument, we find that
a fourth proposition is also needed for the complete neces-
sity of the reasoning, namely the proposition, "The canon
of the syllogism in *Barbara* is correctly applied in this syl-
logism and the conclusion is derived in accordance with it";
this may be called the *validating proposition,* for it makes
us certain that the canon has been correctly applied to this
case of reasoning.   This validating proposition or its equiv-
alent is presupposed in the argument, for its denial renders
the syllogism of no cogency, and, on the other hand, it is
not logically implied by any other of the four propositions
in the syllogism or by any other propositions presupposed
by any one of those four.   Without it or its equivalent,
we could not be sure that our reasoning is valid, that is,

that the premises are of the sort to which the canon applies, that the canon is correctly applied to the premises, or that the conclusion is correctly derived by that process. Any other proposition or set of propositions from which we endeavor to derive the correctness of the syllogistic reasoning would be equivalent to this statement or part of what is included in it, and would be denied in denying the validating proposition. In asserting that the truth of the conclusion follows from the truth of the premises, we are not merely asserting that the relationship expressed in the conclusion exists, but that we *know* that it must necessarily exist, that is, that our deduction is *correct;* the validating proposition is the making explicit of this implied notion which is found in every syllogism; hence the validating proposition is a necessary part of every syllogism. For many purposes, however, the validating proposition may be neglected, because the mere statement of a validating proposition adds no *content* to the reasoning; it is not the statement of the validating proposition which is important, but its *proof,* since without that, some fallacy may be lurking in the argument. It is for the purpose of checking the truth of the validating propositions that the critic usually goes over a series of apparently valid demonstrations. In a formally invalid syllogism, it is the validating proposition which is wrongly asserted.

But the proof of a validating proposition is not to be attained by deductive reasoning. If we should attempt to establish the truth of a validating proposition by syllogistic or any other type of deductive inference, we should find ourselves involved in an infinite regress. No amount of syllogistic inference could establish such a proposition as "This syllogism has a categorical major premise with two terms and a copula," which is plainly involved in the proof of the validating proposition of a syllogism in *Barbara.* If

such a proposition were the conclusion of another syllogism, we could only base it upon some such reasoning as "The presence of certain marks indicates a categorical major premise," and "This syllogism has those marks"; then the proof of the minor premise would need other premises, such as "Some other marks indicate the presence of the first set of marks," and "This syllogism has those marks." Our major premises to these prosyllogisms might be included in a set of primitive propositions for a deductive system, but not the minor premises, and we could continue finding marks to distinguish marks indefinitely without establishing the final truth or our minor premise.   The only deductive proof of a proposition is by finding that it is implied by other propositions; syllogism deals only with propositions: no train of purely syllogistic or deductive inference can attain to the knowledge of a singular proposition unless there is a singular proposition asserted to begin with. But a singular proposition for each syllogism would be an extremely unsuitable thing to include in a set of primitive propositions.   Exactly similar difficulties would be met with in the attempt to establish, by deduction, any other singular proposition, such as, "This is a chair."   Thus the deductive proof of a validating proposition is impossible, because the attempt to establish its truth leads us into an infinite regress of singular propositions.

This infinite regress does not mean that the proof of a validating proposition is impossible, or that the validating proposition does not belong in a syllogism, but merely that the proof of the validating proposition is not by a deductive method.   For certainly we do establish the truth of validating propositions when we go over a set of syllogisms and see for ourselves that the premises do correctly imply the conclusions, or when we check up the reasoning in a logistic

demonstration and see that the processes of substitution or other inference are carried out correctly. How is the truth of that implied validating proposition seen? Plainly by a process of mental comparison. We hold in mind the two premises of the syllogism together with the method of their combination and the conclusion, and observe that in this case the work of combination is correctly performed. There is no mystery about such a comparison; every careful reasoner who uses the syllogism has often performed it. It is possible, because all the entities concerned are mental, and because a small number of propositions can be held in the mind simultaneously, and their agreement perceived by a direct act of comparison. The material offered for synthesis is compared mentally with the definitions and rules which state the requirements for that type of syllogism, and direct observation is made as to whether the material fits the requirements or not. For instance, in the proof of the validating proposition in our example, it would be directly observed that the major premise is a categorical proposition and that it contains two terms united by a copula, that the minor premise is also a categorical proposition, that one of its terms is identical with one of those in the major premise, and that the conclusion is also a categorical proposition, which repeats the two terms of the premises and unites them by a copula in the proper order. It would be also observed that the syllogism has only three terms, that the middle term is distributed at least once, that there are no negative or particular premises, etc. Thus we see that the definition of the formal processes of reasoning and of the kinds of propositions, terms, etc., which are required in any particular type of syllogism is an essential part of the presuppositions of a syllogistic argument, and that the definitions and the rules of what has been called

"formal logic" are needed in the testing of the validity of an argument. Such a direct act of comparison as is involved in that testing is not, however, itself a deductive method of proof, since it does not derive the truth of its conclusion from the truth of one or more further propositions, but from the direct act of comparison itself. We must then admit that every syllogism contains one proposition whose proof is by a non-deductive method.

In ordinary reasoning, we do not usually express any more of our reasoning than is necessary, usually no more than what we think likely to be challenged; hence the validating proposition has been neglected, because each syllogism was supposed to be valid merely because of its statement as a syllogism. The existence of formally invalid syllogisms should have taught us that no syllogistic argument can be complete without proof of its validity and a statement that the process of checking its validity had been performed—a task which is performed in the correct assertion of the validating proposition. When an attempt is made to state all the propositions which are implied in a syllogism, the validating proposition is seen most clearly to be an essential part of every syllogism.

It was the absence of this validating proposition which enabled Mr. F. C. S. Schiller to make the objection that no syllogism can yield absolute certainty or compel assent, because even the most faultless of syllogisms is liable to the defect of ambiguity of the middle term.[3] When the validating proposition is not even implicitly affirmed, not only is the defect of ambiguous middle possible, but any other of the formal fallacies and many of the material fallacies—all of which Mr. Schiller failed to mention. Once the validating proposition is proven to be true, Mr. Schil-

[3] *Formal Logic,* XVI, sect. 6.

ler's objection would be no longer possible, for the true assertion of the validating proposition would eliminate any possibility of an ambiguous middle or of any other fallacy. Most logicians are convinced that a syllogism can be proven to be valid, in most cases by simple inspection, and such is shown to be the case by the successful and unquestioned use of deductive reasoning by philosophers ever since the time of Aristotle. It is of course true that particular individuals may make mistakes in asserting the truth of validating propositions, just as particular astronomers may make incorrect observations, but that fact should not make us any less sure of logical than of astronomical facts. Mr. Schiller's objection means that no syllogism can be proven to be valid, not even the traditional one which concludes that "Socrates is mortal"! If there were any fallacy in this syllogism, some one of the thousands of logicians who have been well acquainted with the fallacies to which syllogisms are liable, including the fallacy of ambiguous middle, and who have used that syllogism since the time of Aristotle, would have long ago pointed out any such fallacy!

We can now state in full form the Aristotelian syllogism which we used as our example:

Major premise: All ruminants part the hoof.

Minor premise: All deer are ruminants.

Canon: In any Aristotelian categorical syllogism, when the eight syllogistic rules are all observed, the major term may be predicated (asserted or denied, as the rules require) of the minor term.

Validating proposition: The above canon is correctly applied to this syllogism and the conclusion is derived in accordance with it.

Conclusion: All deers part the hoof.

The proof that all of these five propositions are needed

in this or any similar syllogism[4] is that the denial of any one of the first four, even when the other three are affirmed, renders the syllogism of no truth-value; and that the place of none of them could be taken by any other proposition except one which is equivalent to it and which would therefore be denied in denying it.   Furthermore these four propositions are deductively independent of each other since no one can be inferred from any of the others, and since the denial of no one leads to a denial of any other.[5]   We may call the first two the *material propositions* or *premises,* since they contribute the *content* to the reasoning, and the next two the *formal propositions,* since they have to do with the *logical operations* performed in the syllogism. There can be no more than these five propositions in any such syllogism, since the two premises contain all the material content found in the conclusion, and any further content which might be thought to be found in the conclusion would also have to be found in the premises or else the syllogism would be invalid.[6]   The formal propositions also state the entire content of the operation performed in the syllogism, and

[4] The validating proposition and the canon of any syllogism may be combined into one proposition and thus the number of propositions in the syllogism reduced by one; but that would rob the canon of its generality, and make it applicable only to this syllogism and no other; to establish such an individual validating-canon, the two propositions which we have called the canon and the validating proposition would be needed, and so the number of prosyllogisms would be merely increased.

[5] Since the validating proposition *contains* the canon as one of its parts, the denial of the canon might seem to render necessary the denial of the validating proposition; but such is not the case, since the canon is not *asserted* in the validating proposition, but merely *considered*. The removal or change of the canon would necessitate a change in the validating proposition, but its denial would not do so.

[6] The number of premises might be increased to three or more and all of them combined into one conclusion by a different canon. Such reasonings are found, but for the sake of simplicity, we shall neglect them, since they can always be decomposed into a syllogism which has only two premises, and the conclusion of that syllogism combined with one of the remaining premises, etc. Complex reasonings of this sort may save time, but perhaps a new name, other than 'syllogism,' should be given to them.

sum up all the presuppositions of that operation. If there could be any more formal propositions, it would be possible to have some new kind of formal fallacy in the syllogism, different from those already known. But it may be safely concluded that if there were any such, some of the logicians since Aristotle would have discovered it.

While our reasoning has been concerned with this particular syllogism, yet it has been in no way dependent upon this example, but has been general throughout, just as the geometrician uses a particular figure to illustrate his reasoning, but does not depend upon it for the truth or generality of his reasoning. So we may safely infer from the general character of our argument that every Aristotelian categorical syllogism has five and only five propositions. Not only so, but a similar argument would show that the other forms of Aristotelian syllogisms, whether hypothetical, disjunctive, or in any other of the traditional forms, being similar in nature, also require these two formal propositions to state all that is implied in the argument. Thus our proof that every Aristotelian syllogism contains *five* and *only five* propositions is complete.

We have now put the Aristotelian syllogism into a form in which reasoning by means of it may be said to be completely rigorous, since we have succeeded in stating all the presuppositions of the resulting conclusion, and have put them into such a form that their combination and the manner thereof is clear and open to inspection. We thus see that deductive inference is not a mysterious indefinable operation, but that it can be defined and described in terms of the analysis we have made. Aristotelian inference in its logical (not psychological) nature is merely a combination of statements into another statement in accordance with an accepted rule. We shall see later that this definition holds

of all deductive inference.   We further see that the cogency or apodictic necessity of a syllogism or syllogistic reasoning is not due to any mysterious form into which the reasoning is thrown, but to the implicit (or explicit) assertion of the canon and the validating proposition of each syllogism, which render the drawing of the conclusion logically inescapable and hence necessary.   The "form" of the two material propositions is merely a device to enable the formal propositions to work upon the material propositions to produce the conclusion.   Any syllogism which does not explicitly state all five of its presupposed propositions should be called an enthymeme.[7]

A similar analysis of the traditional or Aristotelian immediate inference shows that it too has its formal propositions.   When we pass, for example, from the premise, "No men are immortal," to the conclusion, "No immortals are men," by the use of our rule for discovering the presupposed propositions, we see that in addition to the convertend, there is presupposed the canon of conversion, "An E proposition may be converted simply," and also a validating proposition, "The canon of the conversion of an E proposition is correctly applied to this convertend."   The proof of this validating proposition depends upon a similar holding in mind of the material under consideration and careful observation that the canon is correctly applied to it and the conclusion thereby produced.   We may then define immediate inference as reasoning which proceeds from only one premise to a conclusion, with the help of two formal propositions, a canon and a validating proposition, and likewise define the syllogism as reasoning which proceeds

[7] Consequently the number of types of enthymemes is increased to sixteen; since, of the three propositions, the two material premises and the conclusion, two must always be present, certain types of enthymeme, e. g., where the minor premise and the conclusion are absent, are impossible.   Otherwise the entire syllogism cannot be reconstructed from the data given.

from two premises to a conclusion with the help of two
formal propositions. Leibniz showed that it is possible to
throw any immediate inference into the form of a syl-
logism, by the use of a tautologous proposition as one
premise,[8] and thus immediate inference can be considered
to be a means by which certain commonly used sorts of
syllogistic inference may be abbreviated, through a change
in the canon used to derive the inference.

We have thus found, by an analysis of the Aristotelian
syllogism, that every syllogism contains a definite number
of propositions, namely five, which are discovered by the
process of searching for all the deductively independent
propositions whose denial would invalidate the inference.
These five are the two material propositions or premises,
the two formal propositions, namely, the canon of inference
and the validating proposition, and the conclusion. Imme-
diate inference was found to contain one less premise, but
otherwise to be analogous to the syllogism. In this way
these two traditional forms of inference become modes of
completely rigorous reasoning. With this analysis, let us
turn to mathematical and logistic deduction, and see if we
cannot find a similar condition there.

II

Aristotle, in defining the syllogism as "Discourse in
which, certain things being posited, something else than
what is posited necessarily follows on their being true,"
was not defining the syllogism so much as he was stating
the general characteristic of all deduction. The term, syl-
logism, has been reserved for that type of inference which
has two premises and a conclusion, and for the varieties of
that type which Aristotle enumerated. Since his time, logi-
cians, following the lead of the mathematicians, have dis-

[8] *New Essays,* IV, ii, sect. 1.

covered other types of deductive reasoning which are of greater usefulness, and the traditional syllogism has fallen into disrepute. The logician needs a word to refer to any type of deductive inference which combines two premises into a conclusion, and so we may well use the term "syllogism" to refer to such a piece of reasoning, and distinguish those forms of inference which Aristotle enumerated, which have been traditionally called "syllogisms," as the "Aristotelian syllogisms," in contrast to other types of syllogisms. Such will be the meaning of these terms in this paper. We shall find that these other types of syllogisms are essentially similar to the Aristotelian syllogisms.

A careful analysis of what has been called "non-syllogistic inference" shows that it can always be stated in the form of two premises and a conclusion; for, wherever more than two propositions are combined, two of them may first be combined, and then the remaining propositions may be combined successively with the conclusion of the preceding combination. Study of each case of combination will show that, like the Aristotelian syllogism, a canon of inference and a validating proposition are implied—the analogy between the Aristotelian syllogism and the different sorts of "non-syllogistic" inference, when analyzed into sets of combination of two premises, is so close that it is no misnomer to call them syllogisms. We may then say that the syllogism (together with its abbreviation, immediate inference) is the unit of deductive inference. As an example, we take the relational inference that because "John is older than Mary," and "Mary is older than William," therefore "John is older than William." When we search for the propositions which are deductively independent and the separate denial of which renders the conclusion false or invalid, we find that in this inference there is implied a

canon, "In inferences in which the terms of two propositions are joined by an asymetrical transitive relation to a middle term, the subject term of the first premise may be asserted to have this relation to the predicate term of the second premise," and also a validating proposition, "The above canon is correctly applied to this reasoning." In such relational inference it is difficult to call either premise major or minor, and so we may perhaps call the one whose predicate contains the middle term the *first premise,* and the one whose subject is the middle term, the *second premise.* Such is the meaning of these terms in the statement of the canon above.

Analysis of mathematical reasoning will show a similar condition. Such an analysis enables us to clear up misconceptions about the logical function of certain long-used propositions. For example, we take the inference that because "$x = y$," and "$y = z$," therefore "$x = z$." Evidently the axiom that "Things which are equal to the same thing are equal to one another" is involved in this piece of reasoning, but just how has not been clear; it has been both asserted and denied that the axiom is the major premise. The foregoing analysis of syllogistic inference shows us that the two material propositions are "$x=y$" and "$y=z$," and that the axiom is really the canon of inference by which the two premises are combined. A validating proposition is also implied in the argument, as the experiment of denying it will show. We can now state this piece of reasoning in full as follows:

First premise: $x = y$
Second premise: $y = z$
Canon: Things which are equal to the same thing are equal to one another.
Validating proposition: The above axiom of equals is correctly applied to this syllogism.
Conclusion: $x = z$

Logistic inference shows the same characteristics.   For analysis we pick at random a brief demonstration from Mr. Lewis's exposition of the Boole-Schroeder Algebra of Logic:[9]

Theorem 2·6.   If a c 0, then a = 0

Major premise: a c b is equivalent to a · b = a   (1.9)

Minor premise: 0 may be taken as equivalent to b
     (A restatement of the usual form, Let b = 0)

Canon: In any general proposition, any values of the variables
     of that proposition may be substituted for the variables, pro-
     vided the substitution is made in each case of the occurrence
     of the variable.
     (This important canon of substitution of values is used
     throughout by Mr. Lewis, but is only referred to on p. 357,
     (7).)

Validating proposition: The canon of substitution of values is
     correctly applied to this syllogism.

Conclusion of this and *major premise* of the next syllogism:
     a c 0 is equivalent to a · 0 = a

Minor premise: a · 0 = 0   (1.5)

Canon: Equals may be substituted for equals.
     (See p. 357, (6).)

Validating proposition: The canon of substitution of equals is
     correctly applied to this syllogism.

Conclusion: a c 0 is equivalent to a = 0   Q.E.D.

We thus see that mathematical and logistic reasoning are quite analogous to the Aristotelian categorical syllo- gism, with the difference that the relations between the terms of each proposition and the canon of inference are (usually) different.   Here again two material propositions or premises and two formal propositions, the canon of in- ference and the validating proposition, are necessary to draw a conclusion.

The analogues of Aristotelian immediate inference in mathematics and logistic are interesting.   They are found where some rule of operation is applied directly to a propo- sition without the aid of a third proposition.   In this type

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[9] *A Survey of Symbolic Logic*, p. 123.

of inference, mathematics and logistic have been more interested in the canons of operation than in drawing particular inferences, and so have stated their canons explicitly. But Aristotelian logic, in harmony with its genesis and tradition of alliance with rhetoric and argumentation, has concentrated upon the individual transmutations, rather than upon the canons. As an example of non-Aristotelian immediate inference let us take a problem from Mr. Lewis' exposition[10] of the Classic Algebra of Logic.

Premise: $F(x, y) = pxy + q - xy + 0x - y + 0 - x - y$

Canon: The negative of any function, in the normal form, is found by replacing each of the coefficients in the function by its negative. (6.49.)

Validating proposition: The foregoing function is in the normal form and the canon is validly applied to it.

Conclusion: $-F(x, y) = -pxy + -q - xy + x - y + -x - y$

Thus any application of a rule of operation results in a case of immediate inference.[10a]

With this understanding of the syllogism and immediate inference, which are the two fundamental forms of all deductive reasoning, we can make an analysis of a piece of mathematical reasoning. To the mathematician such an analysis will seem unduly prolix, because the ideal of mathematical elegance is to be brief, but only in this manner can all the elements involved be exhibited. It will be seen that it falls easily into these two fundamental forms of deduction. We have purposely selected a trite example, because it illustrates so well the principles involved.

To solve $x^2 - 3x + 1 = 0$ for x, by the formula for quadratic equations.

[10] *Ibid.*, p. 142.

[10a] Since the term "immediate inference" is not really suitable to this sort of reasoning, perhaps it might better be called "transformation," for mathematical transformation often falls into this form of deduction.

A syllogism of substitution of values

A hypothetical syllogism

Immediate inference

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A syllogism of substitution of values

Maj. prem.: If $ax^2 + bx + c = 0$, then
$$x = -\frac{b}{2a} \pm \frac{1}{2a}\sqrt{b^2-4ac}$$

Min. prem.: 1 may be taken as the value of a, and —3 may be taken as the value of b, and 1 may be taken as the value of c.[11]

Canon: In any general proposition, any values of the variables of that proposition may be substituted for the variables, providing the substitution is made in each case of the occurrence of the variable.

Valid. prop.: The canon of substitution of values is correctly applied to this syllogism.

A hypothetical syllogism

Concl. and Maj. prem.: If $x^2 - 3x + 1 = 0$, then
$$x = -\frac{-3}{2\times1} \pm \frac{1}{2\times1}\sqrt{(-3)^2-(4\times1\times1)}$$

Min. prem.: $x^2 - 3x + 1 = 0$

Canon: The assertion of the antecedent of a hypothetical proposition permits the valid assertion of the consequent.

Validat. prop.: The canon of the hypothetical syllogism in the *modus ponens* is correctly applied to this syllogism.

Immediate inference

Concl. and prem.: $x = -\dfrac{-3}{2\times1} \pm \dfrac{1}{2\times1}\sqrt{(-3)^2-(4\times1\times1)}$

Canon: A number multiplied by unity gives itself.[12]

Validat. prop.: The foregoing canon of immediate inference is correctly applied to this inference.

Concl. and Maj. prem.: $x = -\dfrac{-3}{2} \pm \dfrac{1}{2}\sqrt{(-3)^2-4}$

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[11] This minor premise is a restatement of the usual mathematical form, Let a = 1, b = —3, c = 1. It is composite, and to be quite strict, it should have been divided into three propositions and the canon of inference applied three times with three different validating propositions, making three separate syllogisms. But the reasoning is quite prolix without doing that, and since it is clear what the form of reasoning is, I have left it in the form of one syllogism with a composite minor premise.

[12] To be quite strict, there should be as many applications of the canon of multiplication by unity as there are cases in the premise where a number is multiplied by unity, and thus there should be three successive and similar immediate inferences with different validating propositions for each one.

A syllogism of substitution of equals	*Min. prem.*: $(-3)^2 = 9$ *Canon*: Equals may be substituted for equals. *Validat. prop.*: The canon of substitution of equals is correctly applied to this syllogism. *Concl. and Maj. prem.*: $x = -\dfrac{-3}{2} \pm \dfrac{1}{2}\sqrt{9-4}$
A syllogism of substitution of equals.	*Min. prem.*: $9-4 = 5$. *Canon*: Equals may be substituted for equals. *Validat. prop.*: The canon of substitution of equals is correctly applied to this syllogism. *Concl. and prem.*: $x = -\dfrac{-3}{2} \pm \dfrac{1}{2}\sqrt{5}$
Immediate inference	*Canon*: The product of like signs produces a positive sign. *Validat. prop.*: The canon of 'like signs' is correctly applied to this inference. *Concl. and maj. prem.*: $x = \dfrac{3}{2} \pm \dfrac{1}{2}\sqrt{5}$
A syllogism of substitution of equals	*Min. prem.*: $\dfrac{3}{2} = 1\frac{1}{2}$ *Canon*: Equals may be substituted for equals. *Validat. prop.*: The canon of substitution of equals is correctly applied to this syllogism. *Concl.*: $x = 1\frac{1}{2} \pm \frac{1}{2}\sqrt{5}$

Further investigation would show us that syllogisms may be classified in accordance with their canons. It is an important and an as yet largely unaccomplished task for logicians to state and classify the canons of different types of syllogisms in order that different types of inference may be distinguished and the requirements of each type determined. As long as only one type of syllogism

was allowed—that of Aristotelian categorical syllogism in the first figure—and as long as all other forms of inference, even the hypothetical and disjunctive syllogisms, were considered to be merely forms of categorical inference, this neglect of the canon of reasoning might have been excusable; but now that other types of syllogisms have been widely recognized and regularly used by logicians, especially in symbolic logic, it is essential that they be analyzed and enumerated.

Of course a mathematician would be extremely impatient at such prolix figuring; even a bright beginner would probably have jumped from $x = \dfrac{b}{2a} \pm \dfrac{1}{2a}\sqrt{b^2 - 4ac}$ and $x^2 - 3x + 1 = 0$ to $x = 1\frac{1}{2} \pm \frac{1}{2}\sqrt{5}$ at one step. He would thus have illustrated the way the practical reasoner thinks. But he could not have been able to show the wealth of mathematical thought which underlay such a simple process as solving a quadratic equation by formula, and he could not have more than faintly conceived the number of mathematical and logical propositions which required demonstration before such a simple process could be made completely rigorous. By the time he had demonstrated all the minor premises, together with the canons (where they are not primitive propositions), in this simple piece of reasoning, he would have been carried through much of algebra and arithmetic, as well as much of formal logic. Were he to include the enabling propositions in his systematic verification, he would also have had to search for the definition of each type of syllogism and proposition, and the proof could only be by a non-deductive process, which consists in observing that the syllogism and its parts correspond to what would be expected of a valid syllogism.

Another investigation would also show that immediate

inference and the syllogism are by no means independent of each other, but that the first is a means of abbreviating the second. If the major premise of the first syllogism in our last illustration had been stated in a suitable manner,[13] it could have been used as the canon for an immediate inference, and the conclusion of the second syllogism could have been drawn directly. Likewise the two immediate inferences could have been stated as syllogisms by the use of suitable minor premises. Thus logistic and mathematical immediate inference, like Aristotelian immediate inference, is seen to be a method of abbreviating certain kinds of commonly performed operations, which could also be stated as syllogistic demonstrations, through a change in the canon of inference.

It should not be supposed that a proposition which is used as a canon of deductive inference is sacrosanct and cannot be used for any other purpose. While many such canons are primitive propositions for most deductive systems, in a well-developed system, these canons may become premises as well as canons, and other propositions inferred from them. An analysis of the procedure of *Principia Mathematica* will bear out this statement. This work takes the canon of the hypothetical syllogism as one of its primitive propositions (*1.11) and from it and some other canons (which are assumed and not stated) it deduces the canons of the categorical and other syllogisms.

If now we define deduction as that type of reasoning in which, from the truth of one or more propositions, we derive the truth of a further proposition, we can prove

[13] As, for example: In any quadratic equation which is stated in the normal form, i. e., with the coefficients of x^2, x^1, and x^0 summed, and the whole put equal to 0, x will be equal to the negative of the result of dividing the coefficient of x^1 by twice the coefficient of x^2 plus or minus the product of "unity divided by twice the coefficient of x^2" by the square root of "the square of the coefficient of x^1 less 'four times the product of the coefficient of x^2 by the coefficient of x^0'".

generally that all deductive reasoning is syllogistic (in the broader sense of the term), that each syllogism contains the five propositions which we have enumerated, and that completely rigorous deduction consists in throwing the reasoning into the form of syllogism and immediate inference.

Any inference, unless the conclusion has the same or similar meaning as the premise (*i.e.,* is an immediate inference), proceeds from one statement to another, *i.e.,* from one proposition to a different one. But if there is a difference of meaning between the conclusion and the premise, other than a difference in statement of the same meaning, that difference can only be due to the presence of one or more additional ideas (new relations or terms). Now the introduction of a new idea can be justified only by the presence (implicit or explicit) of an additional organized meaning or meanings, which can be stated in the form of one or more propositions. Thus any inference which is more than the repetition of the same meaning in different words can only be justified by the use of at least two propositions which contain the meanings which are combined to produce the conclusion. If more than two propositions are needed, either the set of propositions can be put into the form of a series of proofs which give the conclusion expressed in the piece of reasoning under consideration, or else these propositions can be combined in such a manner as to leave only two propositions (or both). Thus in any deductive inference, it is always possible to sum up the material presuppositions of an inference (providing it is not an immediate inference) into two propositions, and never possible to state these presuppositions in one proposition alone. Hence two material propositions are necessary for every deductive inference (except immediate inference), and the syllogistic character of all deduction is established.

If two propositions (material propositions or premises) are combined in some way to make a third or conclusion, this combination must be made by some rule. Combinations, if they are to be cogent, cannot be made at random, but only in accordance with some accepted orderly rule. This rule is evidently one of the presuppositions of the inference, and whenever we are testing the rigor of an inference by bringing to light its presuppositions, this rule or canon must be expressed. Furthermore, this rule or canon must be correctly applied to the two material propositions under consideration. The correctness of such an application will depend upon the nature of the inference under consideration and the sort of material needed for such an inference, upon the correct use of the rule in dealing with the material, and upon the correct derivation of the conclusion by that application. The correct application of the canon to the material cannot be taken for granted; the existence of formally invalid inference, where the material and the rule may be expressed, but the material does not fit the rule, warns us against merely assuming the correctness of inferences. Hence the correct application of the canon to the material propositions under consideration is also a presupposition of every valid conclusion, and this fact should also appear in the statement of the presuppositions of every inference. Thus four propositions are presupposed by the conclusion of every deductive inference (unless it is a case of immediate inference), whether the reasoning is by means of an Aristotelian syllogism or a mathematical or logistic deduction or any other form of deductive inference. The logical independence of these four propositions is shown by the fact that none of them can be inferred from any of the others, and the denial of any one of them does not necessitate the denial of any other. Because of the analogous character of these different forms

of deduction, they may all be called syllogisms, and the term "Aristotelian syllogism" used to distinguish what has traditionally been called the "syllogism." The derivation of the word, syllogism, from the Greek term for a "collecting" of premises also justifies us in the extension of the meaning of this word. A similar proof would show that immediate inference is analogous to the syllogism, except that it has only one premise.[14]

[14] Mr. Russell has challenged any such analysis according to which every piece of deductive reasoning must have a definite number of premises and propositions, in *Principles of Mathematics*, sect. 39, pp. 35-6. His argument seems to be that all the propositions implied as premises to any conclusion may be simultaneously asserted as a single proposition, and that by the process of 'exportation it is always possible to exhibit an implication as holding between single propositions.' The process of 'exportation' is that of changing a syllogism into an immediate inference, which change often renders the process of inference less clear, and, in the illustration which Mr. Russell gives, seems to require syllogistic demonstration of the conclusion of the syllogism (i. e., that the conclusion r does follow from the premises p and q) before it can be applied. The simultaneous assertion of several premises, if it is the stringing of them together by 'and', does not change their deductively independent nature; on the other hand, if such a simultaneous assertion is the combination of the propositions into another unity, it is itself a syllogistic process.

Elsewhere, (p. 41), Mr. Russell states that 'the rule according to which the inference proceeds is not required as a premiss', and he supports this statement by the infinite regress which would ensue if a deductive proof were offered for what Mr. Russell calls the 'rule.' By the term, 'rule,' he does not mean the proposition which we have called the canon, but the proposition which would result from the combination of the canon and the validating proposition. We have recognized that an infinite regress would result in any attempt to demonstrate a validating proposition by purely deductive means; but the non-deductive nature of the proof of a validating proposition does not justify either its elimination nor that of the canon. The necessity of these two formal propositions in every syllogism or immediate inference is shown by the fact that a denial of either of them, even if combined with the assertion of the other propositions of the syllogism, renders the syllogism invalid, and that no other proposition which is not equivalent to them could take their place.

Mr. Russell has taken the mathematician's practical attitude of attaining the conclusion with a minimum of effort when he proposes to drop such a 'rule' because the argument is valid without explicitly stating it; and he deliberately rejects the philosophical attitude of searching for all the presuppositions of an inference. He recognizes that there is a 'rule' in every deductive inference, and that an attempt to validate this 'rule' by a deductive process leads to an endless regress, and so he proposes to neglect such a rule, because the lack of an explicit statement of the rule does not invalidate the reasoning! He fails to remember that rigorous demonstration makes explicit all that is merely implicit in a piece of reasoning, and so he sacrifices rigor to easy attainment of the goal. Kant was right, as against Mr. Russell, in holding that the synthetic processes of mathematics rely upon intuition.

In the syllogistic character of all deductive demonstra-
tion, whether mathematical, logistic, or Aristotelian, we
have discovered the nature of complete logical rigor. For
it is only by throwing a demonstration into this form that
it is possible to state all the presuppositions of the argu-
ment and to show clearly and exactly how they are com-
bined to produce the given conclusion. By so doing, the
logical nature of the argument is fully enunciated, and it
is completely thrown open to criticism. Hidden presup-
positions, inaccurate statements, incorrect combinations are
all expressed, and easily recognized by the discerning critic.
Because of the non-deductive nature of the proof of a
validating proposition, there may be an opportunity for
inaccuracies to creep in through the incorrect affirmation
of such propositions; but the careful critic will check over
these validating propositions, and so obviate that source of
error. The complete statement of the material and formal
propositions of a syllogism renders such checking very easy.
The reason that the validating proposition has been neg-
lected by logic is probably that its statement adds little to
the correctness of the argument; it is only its proof which
is worth while. The omission of the validating proposi-
tion in the statement of an argument leads to no difficulty,
providing that its presence is clearly understood. The same
situation is found in dealing with records of empirical
observations—the correspondence of the recorded observa-
tion with the observed experience needs to be checked, and
a careful scientist will repeat and check the observation,
but the statement that a check has been made adds nothing
of itself to the correctness of the record, although it adds
much to our confidence in it. In deduction we have the
immense advantage of dealing with permanently unchange-
able materials, so that the correctness of the validating
proposition is always open to observation. We may con-

clude that the nature of rigorous demonstration is to be found in throwing each step of an argument into the form of a syllogism and thus laying it bare to criticism.

In the syllogism there is also to be found a powerful instrument for discovering the ultimate presuppositions of any deductive argument, enabling the enunciation of *all* the primitive propositions of any deductive or mathematical system. For the statement of the five propositions of a syllogism or the four propositions of an immediate inference gives a complete statement of the immediate presuppositions of any given conclusion; we have only to seek for a full statement of the prosyllogism which demonstrates the truth of each of the material and formal propositions of our original syllogism and for the prosyllogism to each of the propositions thus found, and so on, to arrive at a complete statement of the primitive propositions of the demonstration. Thus the process of throwing a demonstration into completely syllogistic form is at the same time a discovery of all of its presuppositions. Such a procedure would not necessarily assure us that we had decomposed all of the presupposed propositions into their simplest form, for there might be a prosyllogism to one of our apparently primitive propositions which we had not noticed; thus the syllogistic statement of an argument is no guarantee that a statement of the *ultimate* or simplest presuppositions has been made; but at least such a procedure assures us that we have omitted none of these ultimate presuppositions, since they would necessarily be implicit in the list of presuppositions which we have discovered, and consequently the task of enunciating them would be rendered very much easier. The syllogism is thus shown to be an extremely powerful instrument of logical analysis.

It may be worth while here to consider some of the conclusions to which the foregoing analysis leads us. In the

first place, it shows the futility of the hope which Socrates expressed in the *Republic,* of deducing all knowledge from *one* proposition. Aristotle showed the futility of this hope,[15] but it has reappeared again and again in the history of philosophy, most recently in Cassirer's ideal of a "scientific concept" which has "concrete universality" because from it can be deduced the special cases which it subsumes.[16] But the very illustration which he gives shows that such a "scientific concept" is impossible, for he gives the example of the general formula of a curve of the second order, from which we can deduce the special geometrical forms of the circle, the eclipse, etc. That process of derivation, however, as he himself states, is by the introduction of a certain parameter, which is allowed to vary. Thus the general formula is the major premise of the deduction, but before the circle can be derived, it is necessary to introduce a parameter, which is the minor premise; and if two premises are combined, that must be done in accordance with a rule, and the rule must be observed to be correctly applied to the case—thus *four* propositions are inevitably implied in the deduction of a circle from the general equation of a curve of the second order, and so at least *four* concepts are shown to be needed, not only one! Each different curve deduced from the general formula would require at least two propositions which are different from any other, a different parameter and a different validating proposition. The ideal of deduction from only one proposition is chimerical.

Our analysis furthermore shows us that purely deductive reasoning is powerless to draw a single conclusion with certainty. It has long been known that deduction is unable to provide its own first premises; but it has not been seen that even when a set of primitive premises is provided,

[15] *Post. Analytics,* I, iii, 4.
[16] *Substance and Function,* I, i, iii.

nothing can be drawn from them with certainty by deduction alone, because each cogent act of deduction requires the (implicit or explicit) proof and assertion of a validating proposition, which can refer to "this syllogism" or "this immediate inference" alone.   The ultimate reason for the necessity of a validating proposition lies in the fact that the conclusion of a syllogism does not merely assert the *existence* of a particular fact or relation, but it asserts that as a consequence of our original presuppositions we *know* that such a fact or relation *must necessarily* exist; hence the drawing of a conclusion implies not merely the premises, but the fact that the conclusion is *properly* drawn, which presupposition is stated in what we have called the validating proposition.

The realization of the helplessness of purely deductive reasoning because of the necessary presence of a validating proposition which cannot be established by deductive processes has not dawned upon some logicians, and we find them living in realms of eternal truth and denying cogency to any non-deductive reasoning!   Unless some non-deductive process can give just as much certainty as deductive processes, deduction itself cannot give certainty.   Since a validating proposition is always a singular proposition which refers to "this syllogism" and no other, a deductive proof of such a proposition must depend upon the ultimate assumption of some proposition concerning "this syllogism."   Unless a primitive proposition referring to each syllogism is included in the primal assumptions of the system, no validating proposition could be deduced, for a singular proposition cannot be deducted from a universal proposition, except by the aid of another singular proposition.   Furthermore a validating proposition would be required for the syllogism which establishes the first validating proposition, and the second one will require a third,

and so there will be another infinite regress! The truth is merely that the proof of a validating proposition is not by a deductive process, but by a non-deductive process of observation.

Our analysis shows us, in the third place, the hopelessness of the ideal of modern rationalism, that of founding demonstration upon a *small* number of self-evident or otherwise established postulates, and, by deduction alone, of deriving a philosophic system. A pure rationalism of this sort would have to list all of its validating propositions among the presuppositions of the system, the number of which would be equal to the number of syllogisms and immediate inferences in the system! The more inclusive and well worked-out the system was, the larger the number of primitive propositions! Yet if the validating propositions were omitted, the system could not have only deductive certainty or necessity. A rationalism which depends solely upon deduction from a small number of propositions is impossible; but, if validating propositions can be established by a non-deductive means, why should philosophy depend exclusively upon deduction?

It is further to be noted that the syllogism, as we have analyzed it, is not an instrument of discovery, but merely of criticism. The usual psychological procedure of thought is to arrive at the conclusion first, by an act of intuition, and then afterwards, often by laborious thought, to analyze out the steps by which that conclusion is demonstrated. Poincaré has left us some admirable examples of the psychological process of mathematical discovery in his account of his own discoveries. Recognition of the purely critical function of the syllogism will go far to invalidate the traditional objections to it, such as the objections that it yields nothing new, that it is useless to discover truth, and that it does not represent the course of thought in reasoning. The

function of the syllogism is merely to test an inference which is already drawn, to determine its validity or to indicate what propositions are needed to establish a conclusion whose ground is already partially given.   It has little to do with psychological processes of thought, but much to do with logical processes of proof.

To sum up: We have found that there are analogues of the Aristotelian syllogism in other types of deductive inference, which analogues may well be called syllogisms, and we have also found that the traditional immediate inference has likewise its analogues in mathematical and logistic inference.   Had we pursued our investigations further, we should also have found analogues of the enthymeme, sorites, and other forms of Aristotelian inference.   We found that each syllogism, of whatever sort, contains a definite number of propositions, namely *five,* which are discovered by the process of searching for all the deductively independent propositions whose denial would invalidate the inference.   These five are the two material propositions or premises, which may be distinguished as major and minor, or undistinguished in importance and called merely first and second premises, the two formal propositions, the canon of combination and the validating proposition, and the conclusion.   A case of immediate inference was found to contain one less premise, but otherwise to be analogous to the syllogism; it was found to be a means of abbreviating certain kinds of syllogistic inference.   Both the syllogism and immediate inference, in fact all deductive inference was found to contain a non-deductive element, and hence we found that nothing can be established by deduction alone, and that unless certainty can be had by some non-deductive process, no certainty can be obtained by deductive means.   Syllogisms may be classified in accordance with their types of canons, and all deductive

reasoning can be reduced to syllogisms and immediate inferences. In this syllogistic analysis of deductive argument we discover the instrument whereby complete logical rigor could be obtained, and a means of discovering all the presuppositions of any deductive argument.

III

In order to illustrate the power of syllogistic analysis as applied to mathematical arguments, both to give logical rigor and to discover unperceived presuppositions, we here give a syllogistic analysis of the first demonstrated proposition in *Principia Mathematica*. Whitehead and Russell assert that they have made all their assumptions explicit[17] in their list of primitive propositions, and that they do not presuppose the operations of logic. We shall see that this demonstration, like all other demonstrations, falls into the form of syllogism or immediate inference; but that, owing to the authors' failure to understand the syllogistic nature of all deductive inference, they have failed in their announced attempt to exhibit all the primitive propositions upon which their systems rests, in spite of their statement that 'proofs will be given very fully'.[18]

The first demonstrated proposition in the *Principia*, *2·01, is given as $\vdash : p \supset \sim p \cdot \supset \cdot \sim p$, which is the principle of the *reductio ad absurdum*. It is concisely demonstrated as follows:

$$\left[\text{Taut} \ \frac{\sim p}{p} \right] \vdash : \sim p \lor \sim p \cdot \supset \cdot \sim p \qquad (1)$$

$$[(1) \cdot (*1 \cdot 01)] \vdash : p \supset \sim p \cdot \supset \cdot \sim p$$

This proof is analyzed and stated in full syllogistic form below, with references to all those propositions which are mentioned by the authors.

First syllogism.

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[17] *Principia*, Pt. I, Sect. A, Introduction to the section.
[18] *Ibid.*, p. 102.

Maj. prem.: If p is a variable elementary proposition, ~p is a variable elementary proposition.

(*1 · 7 of the *Principia*, but not quoted in the demonstration of *2 · 01. I have added the term 'variable' to it, in order to simplify the demonstration.)

Min. prem.: ~p is a variable elementary proposition

(This primitive proposition is implied in the introduction, but nowhere expressed.)

Canon: The assertion of the antecedent of a hypothetical proposition permits the valid assertion of the consequent.

(A restatement of *1 · 11.)

Validat. prop.: The canon of the hypothetical syllogism in the *modus ponens* is correctly applied to this syllogism.

(Proved by inspection.)

Concl.: ⊢ · ~p is a variable elementary proposition.

Second syllogism.

Maj. prem.: Any elementary proposition may be taken as a value of any other variable elementary proposition, in a proposition containing variable elementary propositions.

(A primitive proposition, *not* stated in the *Principia*.)

Min. prem.: ⊢ · ~p is a variable elementary proposition.

(The conclusion of the first syllogism.)

Canon: Any value of a variable may be substituted for the variable, provided that the substitution is made for each case of the occurrence of the variable.

(This important canon of substitution of values is assumed and used frequently throughout the *Principia*, but is *nowhere stated*.)

Validat. prop.: The canon of the substitution of values is correctly applied to this syllogism.

(Proved by inspection.)

Concl.: ⊢ · ~p may be taken as a value of any other variable elementary proposition in a proposition containing variable elementary propositions.

Third syllogism.

Maj. prem.: ⊢ · ~p may be taken as a value of any other variable elementary proposition in a proposition containing variable elementary propositions.

(The conclusion of the second syllogism.)

Min. prem.: ~p is a variable elementary proposition

(This primitive proposition is implied in the introduction but is nowhere expressed.)

> *Canon*: Any value of a variable may be substituted for the variable, provided it is done systematically.
> (The same canon as that of the second syllogism.)
> *Validat. prop.*: The canon of substitution of values is correctly applied to this syllogism.
> (Proved by inspection.)
> *Concl.*: ⊢ · ∼p may be taken as a value of p in a proposition containing variable elementary propositions.

Fourth syllogism.

> *Maj. prem.*: ⊢ : p ∨ p · ⊃ · p
> (*Principia* *1 · 2; in the authors' demonstration it is expressed by 'Taut'.)
> *Min. prem.*: ⊢ · ∼p may be taken as a value of p in a proposition containing variable elementary propositions.
> (The conclusion of the third syllogism; expressed in the authors' demonstration by $\dfrac{\sim p}{p}$)
> *Canon*: Any value of a variable may be substituted for the variable, provided that substitution is made systematically.
> (The same canon as that of the second syllogism.)
> *Validat. prop.*: The canon of the substitution of values is correctly applied to this syllogism.
> (Proved by inspection.)
> *Concl.*: ⊢ : ∼p∨∼p · ⊃ · ∼p

Fifth syllogism.

> *Maj. prem.*: ⊢ · ∼p may be taken as a value of any other variable elementary proposition, in a proposition containing variable elementary propositions.
> (The conclusion of the second syllogism.)
> *Min. prem.*: ∼q is a variable elementary proposition
> (Another primitive proposition which is presupposed but not expressed.)
> *Canon*: Any value of a variable may be substituted for the variable, provided it is done systematically.
> (The same canon as that of the second syllogism.)
> *Validat. prop.*: The canon of the substitution of variables is correctly applied to this syllogism.
> (Proved by inspection.)
> *Concl.*: ⊢ · ∼p may be taken as a value of q, in a proposition containing variable elementary propositions.

Sixth syllogism.

> *Maj. prem.*: p ⊃ q · · = · ∼p∨q   Df

(*Principia* *1 · 01)

Min. prem.: ⊢ · ∼p may be taken as a value of q, in a proposition containing variable elementary propositions.
(The conclusion of the fifth syllogism.)

Canon: Any value of a variable may be substituted for the variable, provided it is done systematically.
(The same canon as that of the second syllogism.)

Validat. prop.: The canon of the substitution of values is correctly applied to this syllogism.
(Proved by inspection.)

Concl.: p ⊃ ∼p · = · ∼p∨∼p   Df
(The 'Df' must be retained here to complete the meaning of the sign =, although this proposition is not itself a definition.)

Seventh syllogism.

Maj. prem.: ⊢ : ∼p∨∼p · ⊃ · ∼p
(Demonstrated by the fourth syllogism.)

Min. prem.: p⊃ ∼p · = · ∼p∨∼p   Df
(Demonstrated in the sixth syllogism.)

Canon: A definiendum may be substituted for its definiens.
(Another important primitive proposition used throughout the *Principia,* but *nowhere expressed.*

Validat. prop.: The canon of the substitution of the parts of a definition is applied correctly to this syllogism.
(Proved by inspection.)

Concl.: ⊢ : p ⊃∼p · ⊃ · ∼p   Q.E.D.

In this analysis we see that because of their failure to understand that every piece of deductive inference (except immediate inference) requires *five* propositions, the authors of *Principia Mathematica* have omitted the canon of combination in each of the syllogisms contained in the above simple demonstration (except in the first syllogism). Failure to analyze the minor premises resulted in the omission of three more primitive propositions. We thus see that the list of primitive propositions of the *Principia* is far from complete. It is not invariably the case in the demonstrations of the *Principia* that the canon is omitted; sometimes the authors see that it is necessary, as in the last step in the demonstration of *2 · 06, where they give

$[(1) \cdot (2) \cdot *1 \cdot 11]$; here (1) and (2) are the premises, and $*1 \cdot 11$ is the canon.[19] The authors take the practical attitude of attempting to reach a demonstrated conclusion with the minimum of effort but they sacrifice logical rigor in so doing. Such a practical attitude is quite justified in a mathematical work which aims to deduce mathematical propositions from their logical foundations, but the too exclusive preoccupation by that attitude prevented the authors from stating completely the primitive propositions upon which their magnificent system rests, although they explicitly made an attempt to do so. The only way in which an adequate enumeration of the primitive propositions of such a system as *Principia Mathematica* could be made and logical rigor attained, would be to recognize the syllogistic character of each step of the reasoning, and to search for all the propositions implied in each step.

    [19] Because of (1) the non-deductive character of the proof of a validating proposition, and (2) because no two validating propositions are identical, but each one is a singular proposition which applies only to 'this syllogism', and (3) because the validating proposition merely guarantees the formal validity of the reasoning, the omission of the validating propositions from the list of presupposed propositions of a system like that of the *Principia* would be no loss, provided that these propositions were clearly understood, and that it was clearly realized that their proof was by a non-deductive method. But the material necessary for the proof of these validating propositions, the definitions of different types of syllogisms, of the types of propositions used in each kind of syllogism, the types of terms and relations, etc. in each kind of syllogism, etc., all of which are now either omitted or tucked away in the prolegomena, should be explicitly provided. It is probably the dim realization of the necessity of stating the characteristics of different kinds of propositions which induced the authors of the *Principia* to spend so much time upon a prolegomena which did not seem to be required in their demonstration, but which is now shown to be essential.
now shown to be essential.

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THE RELATION OF MALEBRANCHE AND LEIBNIZ ON QUESTIONS IN CARTESIAN PHYSICS

IT is well known that Malebranche and Leibniz corresponded over a period of years and that a large part of this correspondence was on the question of the validity of Cartesian physics. It is also well known that as a result of this correspondence Malebranche came to regard Descartes' principle of the conservation of motion as false. Facts did not appear to substantiate the principle and Malebranche came to acknowledge the existence of the conflict between fact and this particular theory. It is, nevertheless, a legitimate question as to how far Malebranche, in making this concession to Leibniz, deserted the principles of Descartes. As a matter of fact, Leibniz's triumph appears to have been moderate. The concessions of Malebranche appear to have stopped here; nothing more important was admitted than that this single Cartesian principle is erroneous.

There are, however, differences of opinion on this point. Malebranche has been commended for the advance he made beyond the principles of Descartes. Cassirer writes that "within the Cartesian school he is the first who has completed the transition from the laws of impact of Descartes to the Leibnizian living force."[1] It is not immediately evident what this transition should mean. Cas-

[1] *Erkenntnisproblem,* Vol. I, p. 481.

sirer here refers explicitly to the efforts of Malebranche to deduce the laws of motion from first principles. The first principles, however, seem to be those of Cartesian physics, and a transition to a law of Leibnizian dynamics is, on this basis, difficult to effect. And it is difficult to conceive how the transition is otherwise to be accomplished than by accepting the *vis viva* as the true measure of force, by denying the absolute distinction between motion and rest, and by acknowledging the importance of the principle of continuity in the formulation of the laws of motion: in short, by becoming a Leibnizian in metaphysics.

But facts indicate that Malebranche was as far removed from the fundamental principles of Leibniz at the end of his revision of Descartes as he was at the beginning. His desertion of the Cartesian account of physical occurrences does not appear to have been very marked. A consideration of the relation of Malebranche and Leibniz, so far as the controversy over Cartesian physics is concerned, may render such a conclusion as this plausible.

Against the principles of Descartes Leibniz urged several cogent objections, the fallacious character of the principle of conservation being of less importance than the rest. The main objections are these, that Descartes' measure of force is not the true measure, that the foundations of his physics leave no place for absolute motion, and finally, that these foundations ignore the principle of continuity, so important in geometry. It is interesting to note that it was during the early part of his controversy with Malebranche that Leibniz first wrote on the importance of this principle. "It is a remarkable thing," he declares in a letter to Arnauld, "to see that almost all of Descartes' laws of motion conflict with this principle, which I hold to be as infallible in physics as it is in geometry, because the Author of things acts as a perfect geometer. If I reply

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to Father Malebranche it will principally be in order to point out the above-mentioned principle, which is of great utility and has not yet, so far as I know, been generally considered."[2] The reply was made in the same year.[3] An illustration of the manner in which Descartes' laws of motion conflict with the principle of continuity may be found in the first and second laws. The first states that if two bodies of equal mass and velocity collide they rebound and retrograde with their original velocity. This follows from the principle of the conservation of momentum. The second states that if one of the bodies possesses a mass greater by an infinitesimal amount, the smaller will rebound and the larger will continue in its original direction.

Had Malebranche taken the law of continuity for a first principle, the foundations of his dynamics would have been removed. Incidentally his metaphysics would have become invalid, since it states that the essence of matter is extension and that nature is fundamentally a continuum. The absolute distinction between motion and rest would no longer be valid; as a consequence force could not be defined in terms of translatory motion, as the product of the mass and the velocity; in addition, motion could not be defined in terms of the change of spatial position, inasmuch as a body apparently at rest does not manifest this change. And, finally, these results would necessitate the rejection of the theory that the essence of matter is extension, since more would be involved in the conceptions of force and motion than geometry provides.

Fortunately for the consistency of his system, the force of the law evaded him completely. He contended that all of the discrepancies in Descartes' laws of motion could be eliminated solely by a consistent application of the principle

[2] Gerhardt Ed., *Bd.* II, pp. 133-134.
[3] *Nouvelles de la Republique des Lettres,* Vol. 19, 1716.

that the essence of matter is extension.[4] This involves a break with Leibniz's principle, for, as he insisted, the great inconsistency of Descartes lay in his supposing that bodies at rest possess a force of inertia. Malebranche could scarcely, on this basis, have been profoundly influenced by Leibniz.

When Leibniz pointed out to Malebranche that the principle of conservation of motion, as that principle is found in Descartes, is erroneous, the whole of Cartesian physics was implicated in the attack. Descartes maintained that the force of a physical system is to be measured in terms of the quantity of motion. The quantity of motion is momentum, expressed by the symbols Mv, and is the actual motion of a body measured in terms of time. The quantity of motion in the universe remains constant, the loss of momentum of one body being accompanied by the increase in the momentum of another. Now motion itself Descartes defined in terms of the change of position; it is the change of position measured by time. A vector would adequately express the nature of motion in Cartesian dynamics had Descartes included direction as an integral part of motion, and, therefore, of force. But Descartes did not include direction, largely, one may suppose, because by defining motion in terms of the change of position the concept of the direction of this change is not necessarily included. Accordingly Descartes' dynamics could contain the proposition that a change of the direction of motion is not accompanied by an expenditure of physical force. It also follows from the definition of motion that force itself will be reduced to spatial terms. It is not the work done by a body, but only the product of the latter's mass and velocity, its actual motion. Malebranche originally ac-

[4] *Ibid.*

cepted both the definition of motion and force, and the law of the conservation of motion.

Leibniz, on the other hand, maintained that the true measure of force, is the *vis viva,* thus adopting a principle of Huyghens. Force is defined in terms of work done, is given by the symbols Mv^2, and is considered the effect of a moving body measured in terms of the distance of its action. The motion Leibniz appears to have had in mind is the motion of a freely falling body. Therefore, the distance through which it falls is an integral part of its motion, and, consequently, is a measure of the force that the motion generates. In other words, the motion that Leibniz was considering is inseparable from gravitation. Distance and direction are essential parts in its conception. Leibniz could thus deduce the law that a change in the direction of a moving body is accompanied by the action of physical forces. And what, philosophically, is more important, the distance that is here involved in motion is a relative distance, a relation among physical masses. Thus it would follow that to the extent in which motion is defined in spatial terms, that is, in terms of the change of position, motion is defined in terms that are relative. Motion regarded as a change of position will, therefore, not be absolute. Cartesian mechanics, Leibniz contended, in defining motion in terms of position leaves all motion relative. This particular objection is not, however, valid, although it is a consequence of defining motion in terms of a freely falling body. Motion in Cartesian dynamics, ignoring the fact that, if the essence of matter is extension, matter is a plenum, is the motion of a physical mass alone in the universe. That space should be essentially a relation of masses possesses no meaning on this basis. Position cannot be otherwise than absolute, if motion is to be defined

at all. In fact the issue between Leibniz and Descartes is the question of the relation between uniform and accelerated motion, and whether they can be defined by the same fundamental principles of mechanics, a question answered by the general theory of relativity. But for Leibniz motion that is absolute, not relative, must be defined as an expression of force, and the motion of a body regarded as the change of position is only a quantitative measurement of this force.

The arguments used by Leibniz in behalf of the *vis viva* as the true measure of force are well known. Only two need be mentioned here. In the first place, the quantity of *vis viva* in the universe may be regarded as constant, whereas the quantity of motion, as defined by Descartes, is not constant. Leibniz employed as a proof that the quantity of motion cannot be regarded as constant, the instance of a falling body. The velocity acquired by a falling body produces a force capable of raising the body to the height from which it fell. Assuming that the same force is required to raise a body of the mass M to the height 4 h as to raise a body of the mass 4M to the height h, it must follow, since the velocity in the first case is only twice that of the second, that Mv^2, not Mv is the measure of force. The law of the conservation of motion fails to meet this case. According to Descartes' law, a body of the mass 4M with velocity of 1 degree, on colliding with a body of the mass Mv, transmits to the latter, assuming it to be at rest, a velocity of 4 degrees. It would appear then that on the Cartesian principle the same force necessary to raise a body of the mass 4M to the height h, would raise a body of the mass M to the height 4 h. With the fall of the second mass a force greater than that required to raise it would be generated. The quantity of motion could not be conserved.

The second argument for the *vis viva* that Leibniz mentioned to Malebranche, is derived from the law of continuity. If motion is defined in terms of force and not in terms of momentum, the absolute distinction between motion and rest need not exist. The distinction is one of kind rather than one of degree only when motion is defined as the change of position. In other words, a qualitative distinction occurs only when motion and rest are relative, not absolute. In addition a body at rest manifests inertia, and, therefore, force. Rest may be defined as the minimum of motion.

Leibniz finally succeeded in convincing Malebranche that Descartes' principle of the conservation of motion is invalid. Empirical evidence indicated the contrary; and Malebranche also came to argue that if two perfectly inelastic bodies of equal mass and of equal and opposite velocities collide, both bodies will lose their entire momentum.[5] The quantity of motion is not in this instance conserved, and although perfectly inelastic bodies do not exist in the universe, the law, to possess significance, must apply to any case that may be clearly formulated.

But Malebranche appears to have conceded to Leibniz nothing more than that Descartes' law of the conservation of motion does not stand without qualifications. He retained the Cartesian measure of force. This fact is clearly indicated by the tables for the calculation of motion formulated after his concession to Leibniz, and by the absolute distinction that Malebranche made between motion and rest.[6] The distinction follows from the definition of motion in spatial terms. The motion Malebranche continued to define was not the motion of a falling body, but a mass changing its position. The validity of the conception of

[5] *Lois générales de la communication des movements*, Ed. by Bouiller, p. 200.
[6] *Ibid*, pp. 195, 197.

gravitational mass Malebranche denied, so that the motion of a falling body must be interpreted in terms of inertial masses and velocity. Force is the quantity of actual motion, not the *vis viva*. Malebranche was thus confronted with a difficulty. If a physical system is to be a system in which force is not destroyed and to which the principles of rational dynamics is applicable, some meaning must yet be found for the conservation of motion. To meet the difficulty Malebranche formulated the principle that in an isolated physical system momentum may be regarded as constant provided all the velocities in a given direction be taken as positive and in the opposite direction as negative.[7] The quantity of motion then remains invariable. Thus, if the system contain two bodies of equal mass and of equal and opposite velocities, the quantity of motion in the system will be zero before and after the impact. Descartes' principle, Malebranche supposed, may be regarded as valid if taken with the above arbitrary modification. For Malebranche, then, nature is a physical system in which all causes are moving particles or molar bodies, no force exists but actual motion, and all motion is defined in terms of the change of position.

All other objections to the Cartesian laws of motion, Malebranche argued, could be met if Descartes' principles were carried to their logical conclusion. Descartes had regarded rest as a species of force, a force manifested in inertia and the solidity of bodies. But rest cannot be a force, if force is defined in terms of momentum and if extension is the essence of matter.[8] Extension contains no concept of force; force can arise only from a successive change of spatial relations. Therefore, Malebranche correctly maintained, motion on the principle of Descartes is

[7] *Ibid.*, p. 198.
[8] *Ibid*, p. 195.

to be the sole cause of all physical phenomena, of the phenomena of the inertia of bodies at rest, solidity, and even of gravitation, which Malebranche argued, could not be explained in terms of action at a distance.   Malebranche was thus led to his hypothesis of the "tourbillons," minute, rapidly moving vortices of matter, a hypothesis that need not concern us here.   It was, however, formulated for the sole purpose of explaining the above phenomena in terms of motion.   Malebranche sometimes assumed that a moving body is endowed with a force, a property capable of differentiating it from a body at rest.[9]   He was scarcely entitled to this conclusion.   If matter is extension, a body in motion in no way differs from one at rest, a consideration that Leibniz was never averse to pointing out.

A more cogent objection to the principles of Cartesian physics may, however, be formulated.   The objection of Leibniz that Cartesian physics renders motion relative has already been mentioned.   It has been pointed out that the objection, as it stands, is invalid.   The valid objection to Cartesian physics is not that it leaves motion relative, but that on its own principles, it deprives kinematic motion of its importance as a physical explanation and involves itself in a contradiction.   Malebranche, in remaining loyal to Descartes, was obliged to support two incompatible principles.

In the first place, since force arises only from the motion of material particles, motion is the only real cause of changes in the physical world.   The concepts of mass and velocity, properties of discrete material entities, are the data at hand.   Accordingly, the motion of matter should be an ultimate and irreducible charactertistic of any

[9] *De la Recherche de la Vérité*, Ed. by Bouiller, Part II, p. 166.

physical process, the terms providing an explanation of the process.

In the second place, if motion is defined in terms of space, the spatial structure of relations must be regarded as independent of matter. Space cannot otherwise serve as a referent. Therefore the ordering relations are independent of the things that are ordered; they are relations composing a three-dimensional Euclidean structure, and the entities they relate are geometrical entities, ultimately points, not discontinuous and moving particles of matter. Space, therefore, expresses a general property of nature not found in these material particles or in observed moving bodies. The characteristic of physical nature that is capable of providing geometrical relations is its extension or its continuity. Nature must, therefore, be in essence a continuum and geometry is an expression of this fact.

The difficulty of forming a consistent theory of nature on these two principles is at once evident. If motion is defined in terms of space, so that the properties of space are independent of matter, motion will inevitably resolve itself into a set of static relations of geometrical elements. Matter will acquire the properties of the relations; since a particle is infinitely divisible, a particle will be reduced to a point and its relations to relations between points. There occurs no change of relations in such a system; and the physical meaning for dynamical effects vanishes along with an absolute distinction between motion and rest. Moreover, since both matter and motion are exhausted by the properties of the relations and the relations are derived from the continuum, matter and motion become, ultimately, properties of the continuum. Therefore, the properties of the continuum, not matter in motion, should provide the real physical explanation of any physical occur-

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rence. Motion will not be an irreducible change of relations of discrete objects and atomicity will not be a fundamental property of any physical process.

This difficulty inherent in Cartesian physics is of importance. It is a difficulty that finds its solution in a contemporary theory of nature, namely the theory of Whitehead. Whitehead's theory of nature is a result of the special theory of relativity, and by means of its basic principles provides a solution to problems raised by the general theory. Now it is interesting to observe that in Whitehead there occur two principles identical with those embodied in Cartesian dynamics. The consequences that logically follow from those in Whitehead's system are found in Descartes. It is one of the many merits of Whitehead's account of physical processes to have rendered these principles consistent. The principles are, first, that the metrical properties of the relations of space and time are independent of matter; secondly, that nature is, as a consequence, ultimately a continuum, since the characteristics of nature expressed by a space-time geometry are not found in the discreteness and atomicity associated with moving matter. And it follows that all physical occurrences are to be explained in terms of the properties of the continuum.

The general theory of relativity postulates the existence of an explicit relation between the metrical properties of space-time and matter. Matter and the physical quantities determine, according to Einstein, the metrical properties of the region. The ordering relations are not, in other words, independent of the entities that are ordered. The special theory of relativity provides the relativity of space and time coordinates in virtue of which physical measurement is conducted. The general theory enables the relativity of measurement to apply not only to Galilean frames

of reference but to frames that are non-Galilean, and this result, according to the original papers of Einstein, necessitates a variable metric of space-time. One factor in determining the metrical properties of any region is the distribution and density of matter in the region.

The conclusion of the general theory is not, however, free from difficulties. Two questions of philosophical importance are raised. The first concerns measurement, and the second, kinematic motion. The two problems are analogous. If what is physically real is synonymous with measured quantities, the question arises as to what conditions of nature must be present to render measurement possible. And, likewise, if motion is a genuine physical property, the question arises as to what other properties of nature must be real in order that motion be possible. The problem of motion is partly a logical problem. Empirically, it is known what is meant by a moving body. But the concept is taken up in theory, where it requires an explicit and clear definition.

If matter is kinematic in nature, as the kinetic-atomic theory implies, if the dynamical theories of heat and gases is to obtain, the properties of space-time are conditioned by matter in motion. Space cannot in such a system serve as a referent for motion, since it is itself an expression of the properties of matter, one of which is motion. On the other hand, if motion is defined as the change of relations of physical entities, the question at once arises as to the manner in which these entities are distinguished. Relative motion cannot possess a clearly defined meaning until the individuality of the terms of the relation is clearly established. The motion of one material particle cannot be defined as relative to another unless some meaning exists for the differentiation of the particles; and for motion to be genuinely relative, the same entity must carry its identity

from one co-ordinate system to another, so that it may be taken as at rest. Thus it is necessary to find some meaning for the discontinuity and identity of the physical bodies. The absolute spatial structure of classical mechanics was a simple and logical instrument for achieving the desired result. A point or a path described by a moving particle, a molecule in a gas, for example, was not defined in terms of matter, but was an element in the independent spatial structure. A particle could be located at a point or its individuality established by the uniqueness of its path. In this respect absolute space with its independent structure was as much a logical requirement in classical mechanics for unambiguously defining atomic motion as for providing the unique referent for accelerated motion. Thus the motions of material particles could be given an explicit meaning.

Now if the implication of the general theory are valid, the properties of space can no more serve to define the uniqueness of the kinematic elements moving relatively to one another than it can define their motion. Immediately observed bodies are differentiated without difficulty by observable relations and properties. There exists no danger of confusing the earth and the sun or a body moving to the earth. But if the kinetic atomic theory of matter is valid, the properties of observed bodies resolve themselves into properties of the unobserved. The motions of the elements of a gas may move with reference to the sides of the vessel or the table on which it rests, or the earth. But if the implications of the theory are developed, the sides of the vessel, its support, and the earth resolve themselves into the motions of unobserved entities, and it is the relative motion of such terms as these that must, in the end, be clearly defined. Such relative motion as this the general theory appears to leave ambiguous.

Whitehead's theory attempts to meet this difficulty by rendering the structure of space-time relations independent of matter. Metrical properties are not an expression of the properties of physical entities. Space may then provide the referent for motion, and motion and rest be defined in terms of position.[10] A four-dimensional geometry expresses the properties of nature not found in moving particles of matter. They express the fact that physical nature is fundamentally a continuum, and the relations along with the physical entities are adjectival properties of the continuum.

Thus, as in the system of Descartes, motion is not an ultimate and irreducible physical process. The temperature and pressure of a gas, or the variations of the potentials in an electro-magnetic field, are not phenomena arising from the motions or molecules of electrons; they possess their ultimate explanation in terms of the continuum of events; and events do not move, and this result applies to all physical processes in which motion is usually taken to be a cause. Whitehead's system is thus consistent.

In conclusion one may say that if nature is a continuum whose properties provide the relations which, in turn, are independent of matter, then Whitehead's system must be regarded as valid. The deductions following from it would appear to be unavoidable. The motion of matter, no more than the occurrence of sounds and colors, will be an ultimate physical process, or the final terms in which an explanation of physical occurrences is to be given. The explanation comes in terms of events which are not point-instants or elements of a geometrical structure. On the

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[10] To contain relative motion, nature must contain various spaces, so that a body moving in one space may be at rest in another. The individuality of the entities is not defined in terms of space, but in terms of the properties of the continuum, that is, events, so that the same entity may be said to belong to different spaces.

other hand, if physical occurrences are genuinely kinetic-atomic in essence, as the foundations of the general theory suggests, then space-time must possess its basis in moving matter. The geometrical relations are an expression of this fact. Motion is not then a change of spatial relations or definable in terms of space. In this respect the dynamics of Leibniz is more in accord with the implications of the general theory of relativity than the dynamics of Descartes and Malebranche, and in this respect Leibniz' objection that Cartesian dynamics leaves motion only relative holds.

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WHERE IGNORANCE IS BLISS

TRUTH, we are assured, is for man the supreme value. Of all the things he has sought and has prized, truth is that which he has held most dear. To this alone will men bow the knee. Humanity through all the ages has peered through sweat-dimmed eyes that haply man might glimpse Truth.

This is the legend concerning man and Truth. And it is a legend. For the gods, indeed, Truth may be the supreme good. In their distant realms of being, the gods may contemplate the essences of things, flames that burn unwastingly and eternally. So Plato and Aristotle would assure us. And Santayana, whose metaphor I have had in mind, would assent. But how can this be asserted of man?

Is it a truth that men, throughout all history, have taken Truth as the highest good? Did men, even in the earliest ages, yearn for the light of Truth? It is tempting to think that the beliefs of the savage are anticipations of civilization's highest insights. Nothing seems more apparent than a universal and persistent devotion to Truth— and yet there is little that is more false. Consider the historical facts, it may be urged. No wars have been more terrible than those that have been waged in the cause of the Truth. No rallying cry has been more effective than the call to defend the Truth. No faith has been more

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stubbornly held than this, that the Truth will finally pre-
vail. The procession of those who have been martyrs to
the Truth is magnificently long. No loyalties have been
more unswerving.   Everywhere, with all races, in all
climes and in every age, savage and civilized alike have
chosen the destruction of earthly goods, and even of life
itself, rather than forsake the Truth.   To be sceptical con-
cerning this, the sentimentalist may urge, is more than
heresy, if there can be anything more debased, for it is
disloyalty to mankind.

Nevertheless there is room here for scepticism. Turn
again to history. It is strewn thickly with the wrecks of
ideas.   The history of mind is largely the history of
cherished errors. Discovery has been the discovery of
falsity. The alleged ruthlessness with which Nature de-
stroys the unfit, its wastefulness, seems to have a parallel
in the history of mind. Men have winnowed the wheat
from the chaff—but how pathetically meager the harvest!
And these falsities—what high endeavours they determined,
and what intense loyalties have they commanded! What idea
so monstrous that is has gained no believers? Mounte-
banks, charlatans, sorcerers, astrologers, diviners, wonder-
workers, demagogues, false prophets—history is replete
with these purveyors of illusion. Ten thousand forms of
magic have been accepted. Upon amulets, charms, talis-
mans, soothsayers, upon those who read the entrails of
animals and those who watch the flight of birds, have men
depended. The magic cap that makes the wearer invisible
has hidden man from himself. The occult virtues and con-
cealed menaces of things have been relied upon. No
evidence has been so highly regarded as that of miracles,
of sacred duel, and of votive tablets hung in temples. The
discovery of superstition occurred but yesterday, where,
indeed, it has occurred. Of all bodies of truth, religious

truths have been reverenced in the highest degree. Yet many gods have come, have secured impassioned allegiance, and of some of them we now learn only when archaeologists have labored with pick and shovel.

All this, it may be said in horrified protest, is an unseemly and mocking paradox. Let us defend men by recognizing that they have clung to error but only because they believed that they were clinging to the truth. That which is false, when known as false, has never commanded service. To be mistaken,—so runs the defense—to cherish un-truth because one whole-heartedly believes it to be the truth, is itself proof that Truth has been taken as the supreme good. Faith that the truth will prevail—what is this but devotion to Truth as the highest value? In his most monstrous adorations, man has demonstrated that of all things he yearns first for Truth. To hold falsehood for Truth, this is the human tragedy. But even in the midst of this tragedy, since it is to Truth and not to error that men do homage, men are like the gods. For gods and men alike revere Truth—but only men can be mistaken. Revised and re-interpreted in this way man's valuation of the Truth is affirmed to be no legend but the golden thread running throughout his history. To think otherwise is mockery and profanation.

It remains, however, a legend. Moreover, it is not mockery, but the pursuit of Truth, to maintain it. For Truth and the truth may be, in the human scheme of things, radically unlike. Here is no new, but an old, distinction; when we forget it, history itself becomes a legend. Faith that Truth will prevail is in no way to be confounded with the faith that *the* truth will prevail. The former is rare. But every warring sect—in science, in art, in morals, and in religion—has the faith that *its* truth is Truth, and that *its* truth will prevail. Loyalty to Truth,

however, is one thing, and loyalty to *the* truth is another. Only when these distinctions have become realities for intellect can mind adopt the pursuit of Truth as its foremost enterprise.   Truth can be established as the goal of mind and its highest good only when mind has become conscious of its proper vocation.   But when it faces the realities, of that vocation, ignorance is perceived to be man's most important practical achievement.

To be ignorant is one thing; to know that we are ignorant is a radically different state of mind.   Socrates insists upon this to every generation that will take heed. To be ignorant, simply not to know while not knowing that we do not know—this is a sheerly negative ignorance. It is not a fruitful condition of mind.   Of course, this negative ignorance is only the other side of a knowingness that is equally unsuspected.   We are likely to say of the uneducated or of the savage, that they are ignorant. But in what sense can they be so called?   A blind man does not know colours; he does not even know that colours are not tastes.   There is for him no colour world at all.   Thus the sciences represent enterprises, labors, conceptions, methods, problems, aims and ideals that simply do not exist for the primitive mind.   Nothing is more useful than an ignorance of which our mind is aware. But the negative ignorance of the savage is not useful. There is no comparison whatever between the latter and that ignorance of chemistry which a musician may admit, or that ignorance of Greek that the geologist cheerfully acknowledges.   If we desire to picture the savage mind in a positive way, we can say neither that he is ignorant nor that he knows, save in emptily negative senses of the words.   In point of fact, the savage may possess admirable skill in various forms of handicraft.   He may "know" what wood to use for bow, what for spear, and how to

hollow out a boat. He may "know" how to weave fabrics
or how to poison his dart. But in a fruitful and dynamic
sense, he really does not know these things—he merely
does them. He gathers from this skill no stimulus to new
inventions, no impulse to the acquisition of new and higher
skill. He is not ignorant, let us say, of the true shape of
the earth. He may possess a myth in the telling of which
he delights—a myth that recounts how the gods made the
floor of earth and the lights of heaven. But myth cannot
be represented as the satisfaction of an inquiring mind.
The myth is the expression of a mentality that knows no
discontent and so can have no intellectual satisfactions.
Nothing can be the satisfaction of a desire where there is
no desire. "The shape of the earth" is a phrase implying
a problem, distinctions, uncertainties, possibilities to be
distinguished. But the savage has thought of no such
problem. Savages are certainly not children when they
are grown-ups. All the more are they unlike our own chil-
dren, whose minds are marked by an ever-stimulated
curiosity leading to the incessant questioning that harasses
parents. The mark of the savage mind is a contentment
that precedes, rather than follows, a process of questioning
and answering. Were it otherwise there would be no
savage mind. It even required the Devil, with all his guile,
to lead Adam and Eve to distinguish between good and
evil. To represent the savage as discovering by research
his bow and arrow, and seeking improvements and new
weapons, as an engineer with an engine, is nature-faking
on an outrageous scale. The savage may appreciate lucky
finds. In his world, his magical world, such things do
happen, as do storms and pestilence and food and famine.
Beyond that he cannot go, and be a savage.

Thus the savage mind is both ignorant and knowing,
in an essentially negative sense. It is a mind that has

never disclosed its ignorance to itself. It has not discovered that discovery is possible. Being ignorant of the very meaning of knowledge, it has never felt the pitiful limitations of mind. Only a great mind, thoroughly awakened, can recognize the frailty of mind. Like the man born blind, the savage feels that his path is strangely difficult; but again like the man born blind he cannot realize how much smoother the path would be could he but see. How shall a blind man comprehend the value of a vision that he has never had—how shall he even comprehend that even vision has its illusions? How can the savage take Truth for his supreme good and the pursuit of Truth for his task?

The discovery of ignorance is, beyond all others, that which is practically the most fruitful. It is true that, in making this discovery, our knowledge is disclosed to us. So meager, however, is this knowledge that, for all practical purposes, the disclosure is concerned not with knowledge but with the possibility of knowledge. Even Socrates could find only this, that he did not know. Socrates thus stands as a symbol of the great crisis for mankind and for every man. In this crisis, ignorance and knowledge receive a positive meaning. This ignorance, this Socratic ignorance, is qualitatively a new thing. An awakening— but it is also a transformation. Its counterpart is the realization that mind has a vocation, and that this vocation is the discovery of Truth. New ideals emerge—of accuracy, of methodical activity, of self-criticism, of tolerance, and of loves and loyalties that are universal. At this point alone does man become to himself a riddle and a paradox. A creature of earth, he discerns a cosmic order. The Sphinx is not the riddle of man—for the Sphinx remains part beast and part man. Only when reason reckons with itself does the beast become man.

Above all it must be acknowledged that only in this crisis can Truth become the supreme value. Truth for the gods, perhaps, implies no pursuit and no activity, but only a serene and marvellously rich quiescence. This cannot be said of man. Truth for man must imply the pursuit of Truth, and this must signify a task with illimitable aims. It is an adventure, and in it many will-o'-the-wisps will lead astray. But so long as Truth is recognized as meaning adventure, we shall not remain astray. We shall suspect of every light that it may be a will-o'-the-wisp: but we shall be humbly cautious lest we mistake a beacon for a will-o'-the-wisp.

The consciousness of ignorance is thus the pre-condition of all discovery. A savage can set forth on no voyages of discovery. A Columbus, knowing his ignorance and suspecting that so much alleged knowledge is ignorance, may venture and find. Thus mind becomes dynamic. It is led to perceive that an ideal of Truth is inseparable from an ideal of the Pursuit of Truth. Mind notes that even truths, all those sets of beliefs that one or another group of men acclaim as *the* truth, must be subjected to ideals defining the pursuit of Truth. This implies scepticism—as an agency for its own dis-establishment. For until the human mind has compassed all Truth—if, indeed, there can be any meaning in such an expression—there must remain the residual possibility of error in all that is acclaimed as *the* truth. Only in this way is growth possible, for growth is not a mere addition but a process of internal reorganization.

Now it may be seen why the account of man as taking Truth to be the supreme value of life is a legend. Man has cherished *the* truth; has cast it aside, only again to hold a new thing as *the* truth. The crisis of the discovery of ignorance having passed, new ideas having been

won, men tend to forsake the enterprise. First results are accepted as final. Passion gives incalculable importance to these achievements of immaturity. Ideas are removed from their setting in the process of inquiry. As instruments in the pursuit of Truth they were flexible. When the glow of adventure is lost, sloth gives fixity to vital movement. Ideas are set up as prizes for a race that is ended. With this distortion mind loses its impetus. The first-fruits of inquiry assume the status of *the* truth. Stubborn defense takes the place of criticism and discovery. *The* truth is cherished and the pursuit of Truth languishes.

In this way, at a new level, we come to lose that pricking consciousness of ignorance which preconditioned the revelation of new gods. The gods indeed become solidified into idols. Inspiration gives way to oracular utterance. The letter that kills is preferred to the spirit that lives. Losing this consciousness of ignorance, we lose also our awareness of the very meaning of Truth. There is no reversion to the condition of the savage mind. Salvation, once we have been expelled from the Garden of Eden, lies in the attainment of Heaven, not in seeking re-entrance into Eden. For salvation men must seek. Whatever else it may mean, for men salvation demands unending effort. We may not know when we have won salvation, but we do know when we have *not* won it. To be convinced that we are saved, to rest assured that salvation lies within our grasp, is to imperil our souls. This is Phariseeism. But when human beings, in the name of *the* truth, would bring to a close the search for Truth, there again is Phariseeism. It is well to remember that of the Pharisee alone did the Galilean despair.

This new and unholy contentment of mind that arises when Truth is confounded with *the* truth, and the spread-

ing of *the* truth is identified with devotion to Truth, is the satisfaction of a desire that seeks tyranny and not freedom. Intellect is reduced to the service of desire—but not in order that desire may be liberalized. Knowledge is taken for granted, without even a recognition of the challenge that accompanies the claim to be knowledge. In this way the most startling contrast of history comes into being. Men make a general admission of ignorance as a formal gesture—but do not make of the admission an operative principle. Every generation discovers in *the* truth of its predecessors many errors and illusions,—and yet scarcely suspects the future estimate of its own mind. For the later generation the superstitions of the earlier time are easily recognizable as superstitions—but that earlier age shows an astonishing inability to make this discovery for itself. The historian shows us that groups of men have clung with equally passionate and unquestioning loyalty to quite contradictory sets of "truths." First one thing and then another is cherished as the highest truth, the final truth, the truth. In this sense, it must be admitted, men have affirmed that truth is of all goods that which is first. But what do the facts suggest? They indicate that the way in which men are so often loyal to the truth is the chief obstacle to the discovery of Truth.

The race of men becomes divided into warring camps. In the very nature of the case there can be no pact which will bring all men into peace one with another. If each party possess *the* truth, and yet each has a truth quite opposed to that of every other, how can all parties be persuaded to the truth of one party? If peace be attained at all in these conditions, it can be only the peace of subjugation. Since in every camp there is confidence in righteousness of cause, inflexibility must oppose inflexibility. Thus the paradox arises: it is loyalty to the truth that divided

men; it is conviction of knowledge that sets them at war one with another. In such circumstances there can be but one way to brotherhood—and that way lies through the consciousness of ignorance. We must become sceptical, not of Truth, but of what other men call the truth, and still more of what we ourselves call by that name. In the moral world—for this there is high authority—the recognition of our unworthiness is the prime condition of charity and of worth. But there is only one world, not one for morality and another for thought. In all the fields of human interest, be it of art or science or religion, possession is a seeking. "Where ignorance is bliss, 'tis folly to be wise"—this is surely the maxim of animality, not for humanity. Ignorance, indeed, is not bliss, but the precondition of bliss; and therefore it is folly to pretend to a wisdom that we do not possess.

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SENSATIONS AND THE CONSTANCY HYPOTHESIS

M R. DURANT DRAKE accuses me of using an argument against the existence of "sensations" that rests on a confusion. I think I can show that his criticism is due to the deficiencies of my exposition, and not to any inherent confusion in the line of thought; and in so doing I may perhaps make clearer some aspects of the question at issue.

The entity on whose *existence* I was in my paper[1] concerned to cast doubt is a psychic event strictly correlated with—or having a constant relation to—an event in an afferent nerve and brain centre. It was this entity that I was attempting to describe in the definition of "sensations" that is quoted by Mr. Drake.[2] The definition is in terms of the constancy hypothesis with an account of which I had begun my paper. Anyone who should hold that the constancy hypothesis has no application, must "therefore" hold that there are no "sensations" in the sense defined. It is true that the term sensations is used less strictly to mean the irreducible sensory elements in our analysis of sense experience. But it will be found that those who so use the term tend to think of a sensation, and in the last resort to define it, *not* in phenomenological terms, but in terms of its relation to its stimulus. I am struck by the fact that this conception of existing sensations, or "atoms of psychology," creeps into psychology and epistemology in unexpected places, and influences them profoundly. It appears in such problems—or pseudo-problems—as the filling in of the blind spot, the reversal of the retinal image, whether black is a sensation, the "analysis" of the margin of consciousness. It underlies the doctrine of subsconscious experi-

[1] "Sensible Appearances, Sense-Data, and Sensations," *Monist*, Vol. XXXIX, pp. 99-120.

[2] "Sensations and the Constancy Hypothesis," *Monist*, Vol. XXXIX, pp. 473-476.

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ence, and the conception of veridical perception in causal theories. The general position taken in my paper is (a) that there is evidence against observable sensations; (b) that the Critical Realists' main argument for the existence of unobservable sensations is open to criticism; and (c) that the history of philosophy explains the belief in both.

I did not, therefore, in defining sensations intend to prejudge the question whether they are, or are not, observable. In Part II, I discussed whether anything that is observable is a sensation. Sensations might be "presentations." I did say, however, that sensations were "hypothetical," and Mr. Drake quotes this as part of the definition, and takes it to be synonymous with *unobservable*. Consequently he finds all arguments against observable entities "beside the point," and my distinction between observable sensations and sense-data "curious." I fear that my assertion that sensations were "hypothetical" was cryptic, and highly misleading. That they were unobservable is not what I meant: I meant to suggest that they were *defined in terms of an hypothesis*—not by reference to observation.

What now is the argument that Mr. Drake finds confused? It is one, he says, in which I conclude that there are no unobservable sensations from evidence that only tends to prove that there are no observable ones. Now my *explicit* argument against unobservable sensations was that they did not explain the mechanism and peculiarities of perception in the manner in which they were assumed to do. But there is also implicit in Part III of my paper—particularly in the opening sentence—the suggestion that the experimental evidence against observable sensations is relevant to Critical Realism. Is this so? Not if the Critical Realists consistently maintain that "sensations are not *discoverable* . . . they are not facts of experience; they are assumed in order to account for the facts of experience."[3] If this is Mr. Drake's considered opinion it is welcome, and it is the position towards which Critical Realists have been working. But there are passages in *Mind and Its Place in Nature* that are not, I think, consistent with it. Thus the arguments for the identification of mental and cerebral states to which I referred[4] do seem to suggest that sensations are observable.[5] Further it is asserted that in-

[3] *The Monist*, Vol. XXXIX, p. 474.
[4] *Op. cit.*, Vol. XXXIX, p. 109.
[5] *Mind and Its Place in Nature*, p. 82 et. seq

trospection can be "veridical" and that in this case we are observing "the very events of our inner life."[6]   Mr. Strong holds[7] that it is possible to observe correctly the intensity, extensity, temporal successiveness and sensibleness of sentience.   The more one considers the nature and complexity of neural process the more unlikely this seems.   Would Mr. Drake accept it?   In so far as it is claimed that when the datum is "referred"—to the self or body—the qualities (*e.g.* intensity) of mental states are observable, I should have supposed that empirical investigation under simple and carefully controlled conditions is relevant.   The empirical evidence to which I referred goes to show that the correlation is between the stimulus constellation as a whole and the conscious field as a *whole*.   This is not favourable to the doctrine of psychic atoms.   Thus, although the evidence against observable sensations may not be relevant to unobserved hypothetical ones, it is not yet clear that it is irrelevant to Critical Realism.

At the end of his discussion Mr. Drake raised the notion of *projection*.   I feel in some degree the force of Mr. Drake's contention that long consideration of the facts of bodily adaptation may lead to a belief in sentience and projection.   Meantime I cannot see that they involve more than physiological events and *what we are conscious of*, either vaguely or distinctly.   Whether such a position can be maintained depends of course on the adoption of a theory of secondary and other qualities alternative to Mr. Drake's view that they are "figments."   Such a theory could not, I think, find any clear meaning for Mr. Drake's fundamental axiom that "existentially speaking everything is where it is."

[6] *Op. cit.*, p. 77.

[7] *Mind N. S.*, Vol. XXXV, p. 45. Mr. Strong holds that sentience can be "enjoyed." But, I doubt if Mr. Drake has any place in his psychology for enjoyment. He reduces immediate experiences to fused sensations.

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NOTES AND NEWS

The following provisional program has been announced for the Seventh International Congress of Philosophy, to be held at Oxford University, September 1-6, 1930.

DIVISION A. *Metaphysics*—General Session: Are recent advances in physics of metaphysical importance?

Section 1: Can science dispense with the notions of substance and cause?

Section 2: Is a philosophy of history consistent with the facts of history?

Section 3: Must biological processes be either purposive or mechanistic?

Section 4: The relations between metaphysics and religion.

DIVISION B. *Logic and Epistemology*—General Session: The value of recent contributions to logic or phenomenology.

Section 1: The nature of perception and its objects.

Section 2: The nature and source of non-perceptual factors in thinking.

Section 3: The relation of scientific thinking to the ideal of knowledge.

Section 4: Is probability objective?

DIVISION C. *Ethics, Politics and Esthetics*—General Session: The value of ethical and political philosophy as guides in practice.

Section 1: Is the distinction between moral rightness and wrongness ultimate?

Section 2: Is the ground of political obligation always one and the same?

Section 3: Has there been in recent times any substantial change in the conceptions of freedom and responsibility?

Section 4: Recent suggestions in the theory of fine art.

DIVISION D. *History of Philosophy*—General Session: In what respects has philosophy progressed?

Section 1. Ancient philosophy: What is alive and what is dead in the philosophy of classical antiquity?

Section 2. (a) Medieval philosophy: The philosophical problems at issue in the XIIIth and XIVth centuries.

(b) Oriental Philosophy: What contributions have been made to philosophy by eastern philosophers (including Jews and Western Arabs)?

Section 3. Philosophy of the XVIIth and XVIIIth centuries: Is it necessary for students of philosophy to go behind Kant?

Section 4. Philosophy of the XIXth and XXth centuries: Absolutism and the revolt against it.

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MEMORIAL TO PROFESSOR L. T. HOBHOUSE

The following communication has recently been issued:

"The recent death of Professor Leonard Hobhouse came as a shock to his friends, who had looked forward to his having a good many years of further work and of development of the unique position which he has held in the study of the social sciences. We feel sure that many of those who directly or indirectly have come into contact with his work will wish to help in the establishment of some Memorial Fund with which his name may be permanently associated, and which may be used to assist in the perpetuation of his influence.

"We accordingly invite subscriptions to such a fund. We hope that those who subscribe may leave us who sign this appeal, as a Committee representative of the many sides of life which Professor Hobhouse touched, to frame a scheme for the Memorial, and to settle at a later date whether any fund raised can be used best for a lectureship, a scholarship or the publication of studies in the social sciences."

This appeal is signed by S. Alexander, W. H. Beveridge, Victor Brandford, H. A. L. Fisher, Morris Ginsberg, G. P. Gooch, J. L. Hammond, J. A. Hobson, Gilbert Murray, Percy Nunn, Herbert Samuel, C. P. Scott, Hubert Llewellyn Smith, Arthur Steel-Maitland, Graham Wallas and Beatrice Webb.

To further the above object the American friends of Professor Hobhouse have formed a committee consisting of Professors John Dewey, Franklin H. Giddings, Robert M. Mac Iver, Charles E. Merriam, William F. Ogburn and Edwin R. A. Seligman. Those who may wish to subscribe to the fund will kindly communicate with the chairman of this committee, Professor Edwin R. A. Seligman, Faculty of Political Science, Columbia University, New York City.

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